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# LO-FREQUENCY AUGMENTOR INSTABILITY INVESTIGATION COMPUTER PROGRAM USER'S MANUAL **LO-FREQUENCY AUGMENTOR**



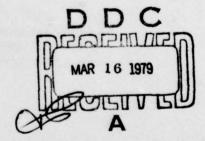
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P. L. Russell, G. Brant, R. Ernst **Pratt & Whitney Aircraft Group Government Products Division Division of United Technologies Corporation** Box 2691, West Palm Beach, Florida 33402

December 1978

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F. N. UNDERWOOD, Captain, USAF Project Engineer

OSEPH C. HURST, Major, USAF Chief, Components Branch

FOR THE COMMANDER

ERNEST C. SIMPS N Director, Turbine Engine Division Copies of this report should not be returned unless return is required by security considerations, contractual obligations, or notice on a specific document.

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#### **FOREWORD**

This report was prepared in accordance with Contract F33615-76-C-2024, Project Number 3066 Lo-Frequency Augmentor Instability Study. The work was conducted under the direction of Captain F. N. Underwood, Project Engineer, TBC of the Air Force Aero Propulsion Laboratory. The Naval Air Propulsion Center co-sponsored the contract and Mr. W. W. Wagner was the program monitor. This report presents the user's manual for the low-frequency instability digital computer program developed by Pratt & Whitney Aircraft Group, Government Products Division of United Technologies Corporation, P. O. Box 2691, West Palm Beach, Florida 33402. This was was performed during the period 1 March 1976 through 1 March 1978 and was submitted for approval 1 April 1978. The principal contributors were G. Petrino, R. Murphy, G. Brant, and R. Ernst, under the direction of P. L. Russell, the Program Manager for the Pratt & Whitney Aircraft Group.

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#### LIST OF SYMBOLS

English Symbol	Definition	Typical Units
A	Area	in <sup>2</sup>
A	Stirred reactor mass loading	gm-mole/sec
A	Dummy variable in eqn. (128)	d'less
a	Reaction index in eqn. (111)	d'less
A <sub>s</sub>	Surface area	sq. inches.
BPR	Bypass ratio	d'less
B/D	Wake width per unit flameholder	d'less
C	Activation energy constant in eqn. (111)	°K
c	Sonic velocity	in/second
$C_d$	Drag coefficient	d'less
	Specific heat at constant pressure	Btu/lbm-°R
$c_{\mathbf{v}}$	Specific heat at constant volume	Btu/lbm/° R
C <sub>p</sub> C <sub>v</sub> C <sub>v</sub>	Wake shape factor	$litre/in^2$
$c_1$	Dummy variable in eqn. (85)	d'less
d	Diameter	in
$D_v$	Diffusion coefficient	in <sup>2</sup> /sec
FA	Fuel-air ratio	d'less
Н	Enthalpy	Btu/lbm
hf	Film coefficient	Btu/in <sup>2</sup> sec° R
k	Reaction rate in eqn. (107)	d'less
k	Thermal conductivity in eqn. (91)	Btu/in sec° R
K	Dummy variable in eqn. (71)	d'less
к <sub>1</sub>	Recirculative coefficient	d'less
L/D	Wake length per unit flameholder width	d'less
m	Mass	lbm
m	Mass flowrate	lbm/sec
M	Mach number	d'less
MW	Molecular weight	lbm/lb-mole
n	Reaction order in eqn. (107)	d'less
N	Flameholder width	inches
Nu	Nusselt number	d'less

English Symbol	Definition	Typical Units
р	Pressure	lbf/in <sup>2</sup>
$\Delta \mathbf{p}$	Pressure drop	$lbf/in^2$
PFSR	Sprayring fuel pressure	$lbf/in^2$
Pr	Prandtl number	d'less
q	Volumetric heat release rate	Btu/second/in
q	Heat flux	Btu/in <sup>2</sup> sec
R	Gas constant	ft-lbf/lbm-°R
Re	Reynold's number	d'less
S	Entrophy	Btu/lbm/°R
St	Turbulent flame speed	ft/sec
S1	Laminar flame speed	ft/sec
T	Temperature	°F, °R, °K
Ti	Ideal temperature	°R
t	Time	seconds
TFSR	Sprayring fuel temperature	°F
U	Flameholder lip velocity	ft/sec
u	Internal energy	Btu/lbm/°R
u	RMS turbulence velocity fluctuation	ft/sec
V	Velocity	ft/sec
Vo	Wake volume	litre
W	Duct width	inches
W	Mass flowrate	lbm/second
WCOOL	Liner cooling flow/total engine flow	d'less
X	Axial distance	inches
$\Delta \mathbf{x}$	Distance	inches
у	Stoichiometry factor in eqn. (108)	d'less
$\Delta \mathbf{y}$	Flame penetration distance	inches
z	Defined in eqn. (76)	d'less
Z	Defined in eqn. (125)	d'less

Greek Symbol	Definition	Typical Units
a	Flameholder apex angle	degrees
β	Defined in eqn. (75)	d'less
$\beta_1$	Droplet vaporization coefficient	d'less
$eta_2$	Droplet collective coefficient	d'less
$\beta_3$	Surface vaporization coefficient	d'less
Γ	Blockage ratio	d'less
γ	Ratio of specific heats	d'less
$\epsilon$	Wake reaction efficiency	d'less
$\epsilon_{ m o}$	Turbulence intensity	d'less
η	Efficiency	d'less
λ	Latent heat of vaporization	Btu/lbm
μ	Viscosity	lbf/in
$\chi_{\alpha}$	Oxygen concentrative	gm-mole/litre
$\chi_{02}$	Oxygen volume fraction	d'less
$\chi_{\mathbf{f}}$	Fuel concentrative	gm-mole/litre
ρ	Density	$lbm/in^3$
τ	Wake residence time	seconds
au'	Normalized residence time	d'less
Q	Axial length between stations	inches
δ	Ratio of specific heats	d'less
τ	Sonic travel time	seconds
Special Symbo	ol:	

 $\Delta$ 

Finite difference

Subscripts	Definition
a	Air
c	Collected; Combustion, fan stream values
ex	Exit
ext	External
f	Fuel
F/H	Flameholder reference
fict	Fictitious
g	Gas
Н	Core stream values
i	Initial — Ideal value
1	Liquid
MB	Main burner reference
o	Initial — Signifies ideal value
OA	Overall
r	Recirculated
stoich	Stoichiometric
T	Total (combined) value
v	Vapor; Vaporized
w	Wake reference
Superscripts	
-	Average value (e.g., $\overline{\mathbf{x}}$ )
-	Superscript denotes steady-state value (e.g., $\overline{\mathbf{V}}$ )
,	Superscript denotes change in a variable divided by its steady-state value (e.g., $P' = \Delta P/P$ )

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#### **SECTION I**

#### INTRODUCTION

Pratt & Whitney Aircraft Group Customer Computer Deck (CCD 1144-0.0) is a two-part program consisting of: (1) Rumble Model — a dynamic analytical model that will predict the rumble stability limits and characteristics of turbofan engine augmentors, and (2) Flameholder Combustion Model — an analytical model that will predict the steady-state combustion field for a turbofan engine augmentor. The rumble model and flameholder combustion model may be exercised independent of each other or the flameholder combustion model may be exercised to supply combustion data to the rumble model (Figure 1).

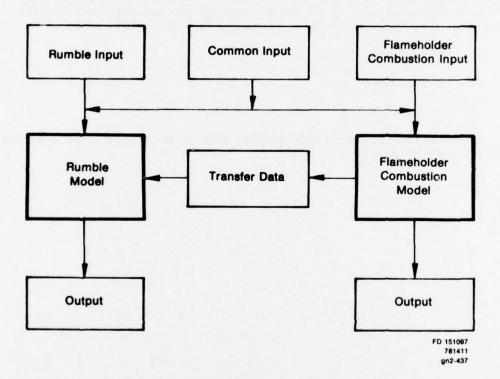


Figure 1. Combined Model Overview

The object of the rumble model is to predict the conditions under which low-frequency augmentor instability (rumble) will occur. The deck will not predict the magnitude of rumble (amplitude) but instead only identifies the conditions under which rumble will occur. The object of the flameholder combustion model is to model the augmentor heat release process in terms of physical geometry and operating conditions for liquid hydrocarbon fuels in a conventional spraybar injector — V-gutter flameholder configuration.

The deck provides the capability of changing augmentor geometry and operating conditions. In addition, the rumble model contains simulations of three augmentor designs: V-gutter, Vorbix and Full Swirl. Since the flameholder combustion model simulates only the V-gutter flameholder, empirical combustion data must be used for the Vorbix and Full Swirl cases.

The User's Manual describes the combined rumble/flameholder combustion model and how to use the program to predict: (1) turbofan engine augmentor low-frequency combustion instability (rumble) and (2) turbofan engine augmentor steady-state combustion field. To assist in checking out the CCD at the user facility, the following items are included:

- (1) Program Listings
- (2) Test Case Input
- (3) Test Case Output

If questions arise concerning deck operation, please contact your local Pratt & Whitney Aircraft field representative.

#### SECTION II

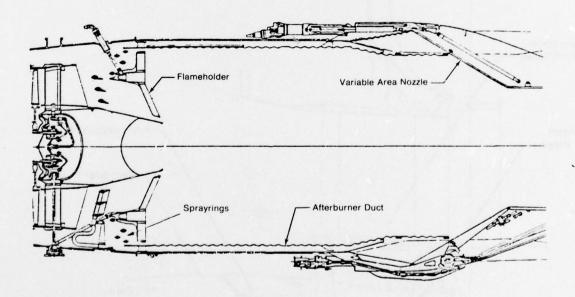
#### **TECHNICAL DISCUSSION**

#### 1. AUGMENTOR DESCRIPTION

Afterburning is a method by which the maximum thrust capability of a basic engine may be augmented by an additional 50 percent, or more. Fundamentally, an augmentor (afterburner) is a ramjet engine attached to the turbine exhaust case of a turbojet or turbofan engine. The gases discharged from the turbine of the basic engine have sufficient velocity at the higher thrust settings to satisfy ramjet requirements, regardless of whether the aircraft is in a steep dive or standing still at the end of a runway.

The basic augmentor (V-gutter), Figure 2, consists of only four fundamental parts: the afterburner duct, the fuel nozzles or spraybars, the flameholders, and a two-position or variable area nozzle. Because the exhaust nozzle area requirements vary significantly depending on whether or not the augmentor is operating, a variable area exhaust nozzle is incorporated.

Thrust modulation in the afterburning mode is accomplished by varying the flow of fuel to the augmentor. However, in order to maintain good combustion efficiency in the augmentor over a wide range of fuel-air ratios, the augmentor is separated into fuel supply "zones" or segments, for best fuel distribution.

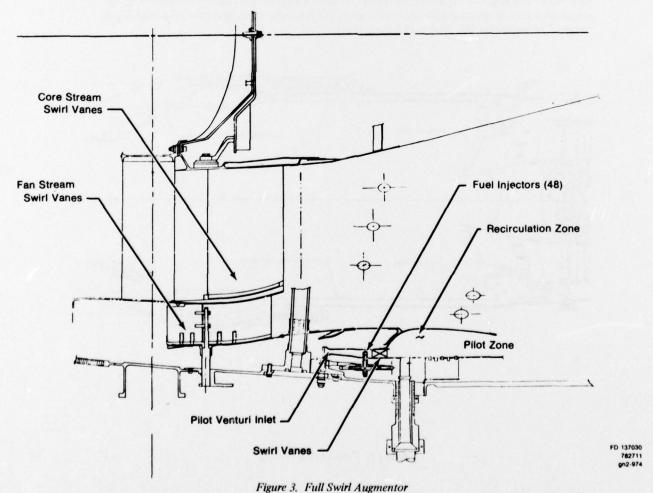


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Figure 2. V-gutter Augmentor

The afterburner duct must be of such proportion that stable combustion can be maintained during augmentor operation. This requires a burning section of sufficient cross-sectional area to ensure that the gas velocity through the augmentor does not exceed the rate of flame propagation. Otherwise, the flame would not be able to establish a firm foothold because the onrushing turbine exhaust gases would push the burning mixture right out of the exhaust nozzle. Fuel is introduced through a series of perforated spraybars located inside the forward section of the afterburner duct. Not far aft of these, flameholders are provided to help create local turbulence and to reduce the gas velocity in the vicinity of the flame. The flameholders may take the form of concentric rings or radial arms of an angular "V" cross section, hence the name V-gutter augmentor.

Two advanced augmentor concepts are currently being investigated under Navy and NASA contracts. Both are swirling flow concepts which eliminate the necessity for flame-holders. In one of the concepts, termed the Full Swirl augmentor, the entire augmentor flow is swirled around the engine centerline, Figure 3. Hot combustion products are provided on the OD of the swirling flow by an annular pilot burner on the OD of the augmentor. Main stream fuel injection is accomplished by several sprayrings. The swirling flow develops a strong centrifugal field in which hot combustion products issuing from the pilot burner on the OD of the swirling flow are rapidly displaced towards the center of the augmentor, while the cooler interior air and fuel mixture are centrifuged outward. Combustion occurs at the interface of the hot and cold gases.



The second concept, termed Vorbix, (vortex burning and mixing) employs a large number of small-scale vortices developed by swirlers or triangular-wing vortex generators. Figure 4 schematically shows this concept. All augmentor fuel flow is admitted through an annular pilot burner located near midspan of the augmentor between the fan and core streams. Combustion occurs as the vortices mix the hot fuel-rich pilot exhaust with air in the fan and core streams.

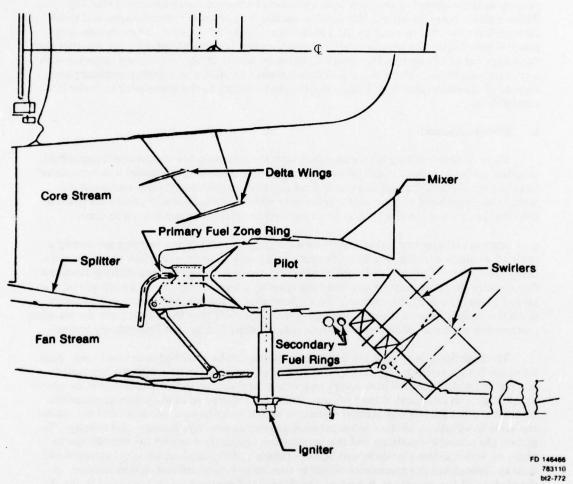


Figure 4. Vorbix Augmentor

#### 2. RUMBLE MODEL PROGRAM DESCRIPTION

#### a. General

The augmentor math model consists of a set of time dependent equations describing the longitudinal dynamics of the flowing airstream and the axially distributed combustion process in the augmentor, coupled with a solution technique for determining stability. These equations are linearized, through the assumption of small perturbations, and transformed from the time domain to the Laplace transform "S" domain. The solution technique is based upon the Nyquist stability criterion and consists of determining whether the time response of the system to a small disturbance would display oscillatory behavior with a growing amplitude. The result is a determination of stability at a given operating point, regions of operation which will cause rumble, and changes to the augmentor to make it rumble-free.

#### b. Modeling Approach

Since rumble has long been associated with the relatively low-frequency longitudinal, or axial, modes of vibration of the air column in the augmentor, the model was formulated to take only the longitudinal dimension into account. Accordingly, each station in the model was considered to represent a plane over which the value of any parameter (such as velocity, pressure or density) could be considered as uniform at any instant in time.

Motion pictures of rumble have shown a change in color of the burning gas during a cycle of oscillation, indicating that alternate hotter and cooler combustion products were being produced. These hot and cold combustion products could be seen drifting from the flameholder to the exhaust nozzle in a time span which matched, or was a multiple of, the period of oscillation of the rumble. Since flowrate out through the nozzle is dependent upon the temperature of the entering gas, it was important that the model treat the traveling combustion products, which were mathematically identified as traveling entropy waves.

The equations developed for describing rumble can be classified into two types. First, there are the momentum, continuity and energy equations, together with the boundary conditions, which describe how each parameter at any station in the augmentor responds to a disturbance in combustion heat release. These are referred to as the acoustic equations. Secondly, there are the combustion equations which describe how combustion heat release responds to variations in the system parameters such as velocity, pressure and density. Together, the acoustic equations and the combustion equations describe the rumble mechanism, by which a disturbance in combustion causes a disturbance in velocity, pressure and density throughout the augmentor which in turn causes a disturbance in combustion. A description of the equations, boundary conditions and assumptions is presented in the Appendix A.

Since the purpose of the program was to develop an understanding of the rumble mechanism and demonstrate that the onset of rumble could be predicted, thereby defining the boundary between stable and unstable operating regions, it was necessary only to model the augmentor for the first few increments of time before the oscillation had built up into an appreciable amplitude. This allowed use of a small perturbation technique which led to linear equations and mathematical simplification. Linear equations can describe the system for small oscillation amplitudes and can predict whether the system initially at rest would begin to oscillate. Because the non-linearities associated with large amplitude oscillations (which eventually stop the amplitude from growing) were ignored, the linear equations do not allow a prediction of the final limit-cycle amplitude.

#### c. Model Description

The rumble model was designed for simple input-output and requires no intermediate engineering interpretation, Figure 5. The input requires engine geometry and pressures, temperatures and Mach numbers, obtained from engine steady-state cycle tables. The user may select to input augmentor fuel-air ratio and empirical combustion data or he may exercise the flameholder combustion model which calculates and supplies the required augmentor combustion data to the rumble model. An input option allows the user to specify the specific augmentor types (V-gutter, Vorbix or Swirl) to be used. No calculation nor dynamic information is required. The user may select either tabular and plotted output or only plotted output, as shown in Figure 6. From the plot the user identifies the frequencies at which the phase is zero. He then checks the gain at each of the identified frequencies. If the gain is one or greater, the program has predicted that rumble will occur. If the gain is less than one, the program has predicted that the operating point is stable. For example, Figure 6 indicates rumble at 60 Hz and at 140 Hz. The user can then change geometry or operating point inputs and repeat the process to determine the effects of the change. This form of output was chosen because it facilitated development of the model, yielded a compact, easy to interpret answer, and made better use of computer time than a time-domain solution.

To model, rumble required a transient description of the longitudinal dynamics of a turbofan engine. To computerize the formulation, the mathematical description was simplified by restricting the range of validity of the equations to small perturbations about a mean steady-state operating point. This allowed linearization of the equations to a form which correctly describes small scale transients, but in which the nonlinear terms which are important in large scale transients could be omitted. The resultant linearized equations describe the initial period of the time when rumble oscillations begin to grow and are valid to the point where the rumble amplitude reaches values at which the nonlinear terms become important. This is sufficient to determine whether an engine, if placed at a given operating point, will spontaneously bloom into rumble.

The model could have been made to yield solutions in the time-domain by programming the equations on an analog computer. The output would have been a time trace of any selected parameter (e.g., augmentor pressure). At a stable operating point the trace would be a straight line, whereas at an unstable operating point the trace would show a sinusoidal oscillation with an increasing amplitude. The amplitude would grow without bound for as long as the solution continued, because of the omission of the nonlinear terms.

The same information can be more easily obtained by a non-time-domain solution technique. Such a technique was chosen for the rumble model. Commonly called the Nyquist criterion, it is based upon the fact that the allowable forms of the time-domain solution are known. This technique allows use of a matrix program which can quickly solve large numbers of simultaneous equations.

The Nyquist criterion is a procedure which makes use of the Laplace transform and conformal mapping to determine whether the transient solution would show unstable behavior. To apply the criterion, the time-domain equations are transformed into the Laplace "S" domain. The result is a square homogenous matrix. The determinant of the matrix coefficients is a function of "S", called the characteristic function, and contains all of the information needed to determine whether the system being described is stable or unstable. If all zeros of the characteristic function have negative real parts, the system is stable; if any zeros have positive real parts, the system is unstable. Conformal mapping is used to examine the characteristic function for the presence of zeros with positive real parts.

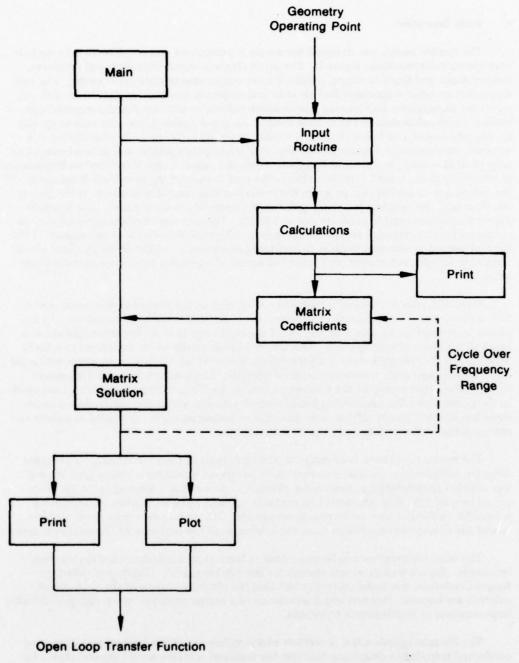


Figure 5. Rumble Model Flow Diagram

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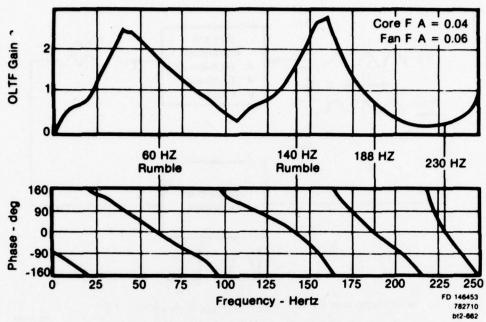
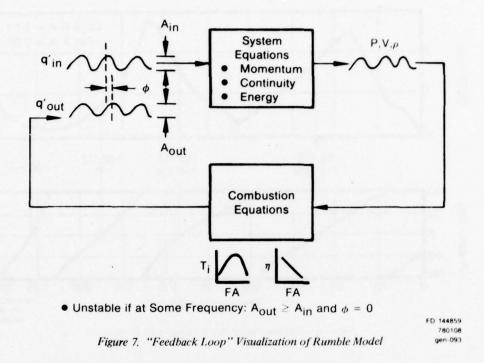


Figure 6. Rumble Model Plotted Computer Output

To accomplish the conformal mapping the equations which describe the augmentor were written to describe a "feedback loop". The feedback loop was formed for the rumble model by considering that the combustion rate, called  $\mathbf{q'}_{in}$  was an "input" to the acoustic equations. This yielded as "output" the pressure, velocity and density at each station throughout the engine. The "output" was then considered to feedback through the combustion equations to form a "feedback" combustion heat release rate, called  $\mathbf{q'}_{out}$ . The resultant "loop" is shown in Figure 7. Actually, only one heat release rate is present. The use of the two names  $\mathbf{q'}_{in}$  and  $\mathbf{q'}_{out}$  allows the formation of the ratio  $\mathbf{q'}_{out}/\mathbf{q'}_{in}$ , called the "Open Loop Transfer Function" (OLTF). Conformal mapping to examine the zeros of the characteristic function is carried out by using the OLTF.

Referring to Figure 7, the heuristic argument can be made that if a loop is subjected to an externally supplied sinosidal input  $(q'_{in})$  and it returns a feedback  $(q'_{out})$  which is in phase with the input  $(\phi=0)$  and of equal amplitude (gain = 1), then the externally supplied input could be removed and the loop would continue to oscillate. A gain greater than one then implies that the loop would be driven to ever higher amplitude, while a gain less than one implied that the oscillations would die out once the input were removed. The model determines whether the time solution, if calculated would display oscillatory behavior with a growing amplitude. It does this through a solution technique which is simpler and faster to apply than a solution in the time-domain.



#### 3. FLAMEHOLDER COMBUSTION MODEL PROGRAM DESCRIPTION

#### a. General

The combustion model performs a multi-streamtube analysis of the flame stabilization and propagation phenomena in a turbofan augmentor. The augmentor is divided into a multitude of equivalent two-dimensional streamtubes with a single flameholder element in each. The program evaluates each streamtube and then mass averages the results.

For each streamtube the program proceeds from the augmentor inlet towards the exhaust nozzle and evaluates each step in the stabilization and propagation of the augmentor process. The ultimate result is the level of combustion efficiency in that streamtube. The program then performs a small perturbation in velocity, pressure, inlet temperature and fuel-air ratio to evaluate the efficiency slopes.

The final outputs are the fan duct efficiency, the core stream efficiency and the efficiency slopes with respect to the four perturbed variables.

#### b. Modeling Approach

The approach taken for each streamtube is a step-by-step solution to the physical phenomena which determine the flame stability limits of the spraybar-flameholder configuration and the subsequent turbulent flame propagation rate. These phenomena include liquid fuel injection, droplet formation, vaporization, fuel impingement onto the flameholder, wake reaction kinetics and turbulent flame penetration.

The approach used is different for the fan duct streamtubes and the core streamtubes. The necessity for different approaches lies in the degree of liquid fuel vaporization between the spraybar and the flameholder. In the core streamtubes, the fuel is virtually totally vaporized in the first few inches by the hot turbine exhaust flow. In the fan duct stream, the much cooler airflow results in only a slight degree of vaporization in the four to six inches typical spraybar to flameholder distance.

The core stream analysis is thus done assuming that the fuel at the flameholder is in the vapor phase and the flameholder wake fuel-air ratio is the same as the total fuel-air ratio. This value is used in the kinetics analysis of the wake reaction to evaluate the stability limits.

In the fan duct streamtubes, however, the low level of droplet vaporization yields a vapor phase fuel-air ratio at the flameholder which is well below the lean limit for hydrocarbon fuels. Since the liquid fuel droplets are not capable of entering the flameholder recirculation wake due to their excessive momentum, there must be some other mechanism to provide the necessary wake vapor fuel for stable combustion.

This mechanism in the fan duct streamtubes is the collection of the liquid fuel droplets onto the surface of the flameholders and the vaporization of the resultant liquid film. This evolved vapor recirculates into the flameholder wake with a portion of the droplet evolved vapor fuel to generate the wake vapor fuel concentration.

The streamtube analyses compute the degree of wake reaction at the level of vapor fuel-air ratio appropriate to the streamtube type and approach conditions. For the fan duct cases, this requires a convergent solution between the wake kinetics and the surface vaporization.

Once the flameholder wake reaction level is evaluated, the analysis computes the rate of flame penetration into the free-stream as a turbulent flame sheet. This rate is adjusted by the wake reaction level to account for the ignition response in the recirculation zone shear layers. The flame penetration rate is integrated over the available augmentor length to provide the level of streamtube efficiency.

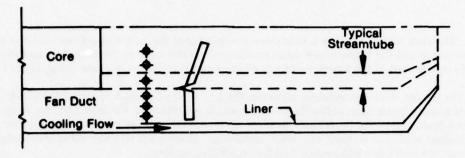
The program thus performs a quantitative evaluation of the phenomological processes which occur in the turbofan augmentor. The individual calculations are a combination of analytical evaluations and empirical results as required to ensure quantitative accuracy.

#### c. Model Description

The combustion model was designed as a complete unit. The program does not require on-line engineering interaction. The combustion model may be run as a separate entity or as a generator for subsequent stability analysis with the rumble model. When exercised alone, the combustion model is an augmentor analysis program and the output is a comprehensive description of the injection, stabilization and flame propagation processes. In this mode, the program is useful as a design tool for conventional turbofan augmentors. The effects of fuel system distribution and V-gutter flameholder tailoring may be determined.

When exercised in conjunction with the stability analysis, a lesss extensive output is given and the prime purpose of the program is to generate the response of augmentor efficiency to variations in fuel-air ratio and inlet velocity, pressure and temperature.

The augmentor breakdown and specific description of one streamtube is shown in Figure 8. For a single fan duct streamtube, the computer logic is shown in Figure 9. The identified subroutines each evaluate a specific portion of the overall combustion process.



BPR = W<sub>Duct</sub>/W<sub>Core</sub> ; WCOOL = W<sub>Cooling</sub>/W<sub>Total</sub>

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Figure 8. Location of a Core Streamtube in a Turbofan Engine Augmentor

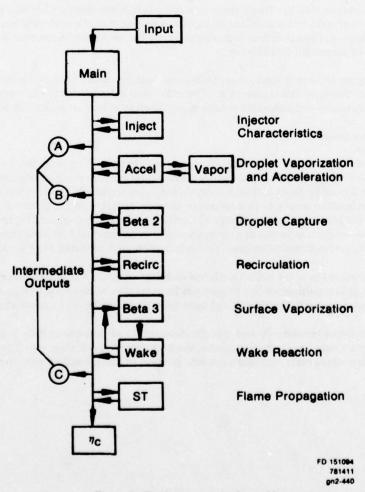


Figure 9. Single Streamtube Logic Map

The input requirements for a fan duct streamtube are those to fully describe the approach flow field, geometry of the streamtube and flameholder, and the total fuel-air ratio. The execution of one streamtube proceeds as follows:

#### (1) INJECT

This subroutine evaluates the droplet sizes formed by a variable area spraybar as a function of the injection pressure drop. Five droplet sizes are calculated which represent the cumulative volume versus pressure drop curve for this spraybar type.

This subroutine evaluates the amount of the liquid fuel which is flash-vaporized by the injection process. This evaluation is performed as an adiabatic expansion process from the high-pressure spraybar fuel condition to the low-pressure augmentor conditions. The appropriate fuel enthalpy chart is used, keyed by the fuel type input variable.

The liquid flowrate which remains is partitioned equally into the five size groups. The total flowrate is originally calculated from the total fuel-air ratio input and the air flow which is calculated from the streamtube geometry and flow conditions.

#### (2) ACCEL

This program subroutine evaluates the rate of droplet vaporization and acceleration which occurs between the spraybar and the downstream V-gutter flameholder.

The equations for acceleration assume a spherical liquid droplet which is accelerated by drag forces only. The drag coefficient is evaluated as a function of Reynold's number based on the relative air-liquid velocity.

Concurrently, the rate of liquid vaporization is evaluated as forced convection mass transfer utilizing a mass transfer Nusselt number correlation which is also based on the relative velocity Reynold's number. The requirement to simultaneously solve the vaporization and acceleration equations was met by a finite difference solution. A small time increment is selected and the acceleration solution performed to generate a velocity increase for the liquid droplet. Using the average velocity over this time increment, a vaporization rate is calculated and a vaporized fraction evaluated. This sets a new droplet size for the next time interval. The average velocity over this time is also used to calculate a distance travelled.

This procedure is repeated until either the liquid droplet reaches the flameholder or is fully vaporized. This analysis is repeated for each size group of the five initially set.

#### (3) COLLECT

At the flameholder plane, the program evaluates the rate of liquid deposition onto the surface of the V-gutter. This deposition occurs as the liquid droplets are unable to follow the divergent air flow streamlines around the leading edge of the flameholder.

The evaluation of the rate of deposition is performed as a correlative solution to the point where liquid droplets just hit the flameholder surface. The variables include flameholder geometry, droplet diameter and flow conditions. The correlation equations are based on calculations which were done externally to this program, where limit trajectories were established based on potential flow solutions to the flow field approaching the flameholder.

The program utilizes the droplet diameter which exists after the vaporization evaluation to calculate the percentage of the liquid flowrate in each size group which is deposited on the V-gutter surface. This is done for each of the five size groups. The collection mass flowrate is evaluated from each size group collection percentage and the liquid flowrate in each group at the flameholder.

#### (4) RECIRC

The gaseous recirculation rate into the flameholder wake is evaluated from a variety of literature sources which present recirculation zone volume and flowrate as a function of flameholder geometry and flow conditions. The program evaluates a "recirculation efficiency" which is the ratio of recirculated mass flow to the flowrate through the area blocked by the flameholder. This typically runs 15 to 25%.

The correlations cover a range of the variables which control the recirculation such as flameholder apex angle, blockage, approach Mach number, and temperature. The result of the subroutine is the recirculation zone. These are used in the analysis of the wake reaction efficiency.

#### (5) WAKE

The wake reaction is treated as if it occurred in a well-stirred reactor with volume and entry flowrate as evaluated in RECIRC. The kinetics are assumed to proceed as a single-step, second order conversion process. The kinetics utilize rate coefficients which simulate aircraft fuel behavior. The required inputs are wake volume, wake fuel-air ratio, recirculation rate and inlet conditions of pressure, temperature, etc. The output of the analysis is the wake reaction efficiency and mean wake temperature.

#### (6) BETA 3

This subroutine evaluates the degree of vaporization of the liquid film which exists on the flameholder surface. The vaporization process is one of forced convection from the surface into the trailing wake shear layer and heat transfer from the flameholder wake through the flameholder metal into the liquid film. The program utilizes a small element approach using 10 elements on each side of the flameholder. The mass flux and heat flux are evaluated for one-at-a-time starting at the flameholder leading edge. Any liquid left unvaporized is assumed to leave the trailing edge of the flameholder and traverse through the wake shear layers downstream.

The solution of WAKE and BETA 3 must be done simultaneously since BETA 3 requires wake temperature to find fuel vaporization and the vaporization influences WAKE through fuel-air ratio.

The solution approach is described in Appendix B with a typical result shown here in Figure 10.

#### (7) FLAME

The turbulent flame propagation downstream of the flameholder uses a small step difference solution with axial profiles of turbulence, flow, etc. The procedure is described in Appendix B.

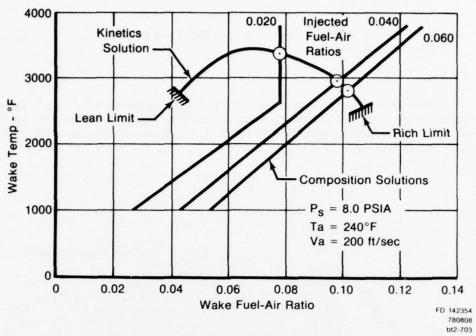


Figure 10. Duct Stream Flameholder Wake Solution

#### d. Input Requirements and Comments

PS6

The model requires as input the physical variables which describe the fan duct and core stream geometry and operating conditions. Since the model functions by repetitive analysis of single streamtubes, the input is required for each different type of streamtube. A different type is one with any input variable different.

The input requires the following values along with the input described in Section II. 6.

BPR Actual value. Default to 1.0 if run as a duct burner with no core engine and WCOOL = 1/2 x (mcool/mduct)

M6C Inlet Mach numbers

NTC No. of types of fan duct streamtubes

NTH No. of types of core streamtubes

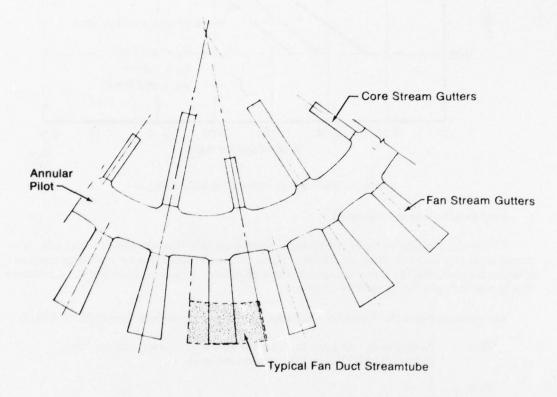
Inlet static pressure, psia

Array input is required to describe each streamtube fully. These array values are aerodynamic and geometric. The array is the number of streamtube types in the fan (NTC) or core (NTH) and the number of stream flow tubes of each type identified in the fan (NSC) or core (NSH) sections. If three different types of fan streamtubes are used (NTC = 3), with a total number of 28 fan streamtubes (18 of flameholder width (FHWC) = 1.0 in., 4 of flameholder width = 0.75 in. and 6 of flameholder width = 1.25 in., NSC = 18, 4, 6) and if the first two types operate at the same fuel-air ratio (FAC), but different from the third, then the input to the model to describe this case would be (see Figure 18):

δ Input . . . . . , NTC = 3, NSC = 18, 4, 6, FHWC = 1.0, .75, 1.25, FAC = .05, .05, .045, . . . .

 $\delta$  End

The program as currently written assumes a unit depth streamtube, i.e., 1 inch depth. The mass flowrates will be based on this value. If true flow values are required, the number of each type (NSC or NSH) should be the number of 1 inch deep streamtubes of that type. This is shown in Figure 11.



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Figure 11. Location of Typical Fan Duct Streamtube

The geometric inputs required for a single streamtube are shown in Figure 12. The value of blockage is referenced to Figure 11. The input should reflect the ratio of flameholder width to the streamtube limits. This value of blockage sets the required flame penetration for 100% efficiency and must be input correctly.

The value of EPSC is the approach turbulence and will affect the flame speed. Unless specific data are available, use a value of 0.04 for a turbofan engine.

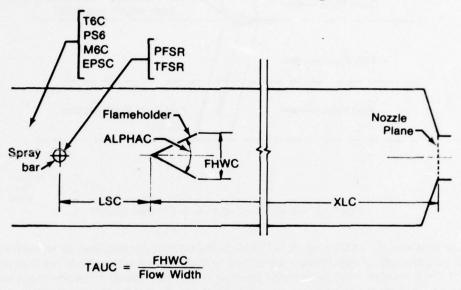


Figure 12. Single Streamtube Geometry and Flow Inputs - Fan

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The input value for PFSR controls the mean droplet size from the sprayring, which has data from a variable area orifice built in. If other values are desired, use the equation:

$$d_{50} = 795 - (PFSR - PS6)^{-4}$$

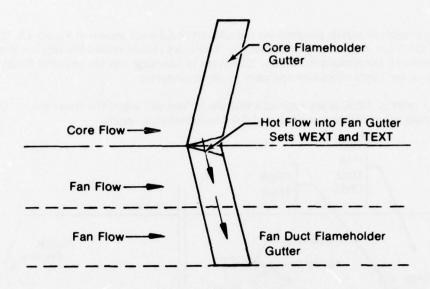
to determine the input value of PFSR required to yield a desired mean droplet diameter, in microns. This is the only place where PFSR is used, so no disruption occurs if non-true values are input.

For the aerodynamic inputs, also reference Figure 12, the required input is shown. As previously mentioned, PS6 is assumed to be uniform across the streamtubes.

One input set requires external evaluation. This is the values assigned to WEXT and TEXT in the fan duct streamtubes. The purpose of this input is to account for the influence of hot gas migration down the wake region of the fan duct flameholders from either the core or from a pilot. WEXT is defined as the ratio of this "external" flowrate to the recirculated flowrate. To allow for flexibility in design selection, this input format was selected. The user must evaluate whatever flowrate is expected and calculate WEXT. For use in estimating the recirculated flowrate, assume  $K_1 = 0.25$  use:

$$\dot{m}_r = K_1 \cdot \rho a \, VaN$$

for recirculation rate per inch of flameholder length. Typical values of WEXT are .02 to .04. TEXT is the temperature of this "external" flowrate. These are shown in Figure 13.



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Figure 13. External Heat Addition to Fan Duct Gutters

The liner cooling airflow input, WCOOL, is the ratio of cooling liner air to total engine air. As such,the engine bypass ratio is required to evaluate the net available fan duct airflow. If no cooling air is taken from the fan duct or if input fuel-air ratios are based on the ture net air available for combustion, input WCOOL = 0.0. If a duct burner is being analyzed and it does have a cooling liner, set a dummy value of 1.0 for BPR and set WCOOL by:

WCOOL = 
$$\dot{m}_{cooling/2} \cdot \dot{m}_{duct\ burner}$$

#### e. Output

The program has two output formats, long and short. The long format presents detailed values for the processes which control the wake vapor-phase fuel-air ratio and flame penetration. The short format essentially presents the overall results. For both, the results are presented as a streamline-by-streamline analysis with fan and core summaries.

#### (1) FAN STREAMTUBES

The long format presents the input data for each streamtube and two calculated values. These values are the effective streamtube fuel-air ratio and the effective recirculation temperature. The equations used for these are shown in Appendix B.

The output lists the calculated values for the injection process; mean droplet size and flash vaporization; and the influence coefficients,  $\beta_1$ ,  $\beta_2$ ,  $\beta_3$  and  $K_1$ , which control the wake fuel-air ratio. The importance of these values is explained earlier in this section and Appendix B.

A word of caution is in order here. If the output is preceded by the warning that the wake temperature iteration has failed, the situation is such that the wake has exceeded the rich limit at the input conditions. Although output is presented, it is not valid and merely represents the limits of the internal convergence search routine. For example, wake temperature will always be  $5000^{\circ}$  F for a failed case. If a single streamtube is being run, several other error messages will result as the program attempts to interpret zero efficiency. If multiple streamtubes are being run, the program will ignore the failed streamtube in all calculations.

The initial flame speed is the laminar flame speed at the appropriate inlet conditions. The turbulence level is the value induced by the flameholder.

In the stream efficiency section for each streamtube, the following comments are applicable:

- The ideal temperature use is based on the effective fuel-air ratio.
- The efficiency is the ratio of flame penetration to streamtube width at the exhaust nozzle.
- The actual temperature rise is based on the above conditions. The exit temperature is based on streamtube inlet plus this actual temperature rise.
- The flowrates are for a 1 inch deep streamtube. The fuel flowrate uses the effective fuel-air ratio.

The fan streamtube summary presents the major items from each streamtube and then the exit average results. The cooling air flowrate ratio is repeated here. Two more values of combustion efficiency are presented and two values of average exit temperature.

The average streamline exit temperature is the mass weighted average of the individual exit temperatures. The chemical combustion efficiency is based on this value for exit and an ideal temperature use based on the average effective fuel-air ratio and average inlet temperature.

The average duct exit temperature includes the mass weighted effect of the liner cooling air being added to the streamtubes at the exhaust nozzle inlet. The average thermal combustion efficiency is based on this exit temperature, the average inlet temperature and an ideal temperature rise is based on the average input fuel-air ratio.

Since engine analysis procedures generally base the fan duct fuel-air on the total duct airflow and use the thermal nozzle inlet averages, the value of thermal combustion efficiency is the one which is used for rumble prediction.

The total flowrate presented here includes the number of each type of streamtube as do all of the above-mentioned mass averaged values.

Also note that at no time are efficiencies ever mass averaged directly. All average efficiencies are based on comparison of the average results of individual streamtubes to the result of the average inlet. That is, the burn-then-mix process is compared to the ideal mixthen-burn process. Since curves of ideal temperature rise exhibit peak vs. fuel-air ratio, the average efficiency of two streamtubes, one lean and one rich, may very well be less than either streamtube separately.

#### (2) CORE STREAMTUBES

Due to the absence of droplet effects, the output is greatly simplified. The wake reaction results are presented as well as initial flame properties. Without liner cooling air, there is no fuel-air ratio shift and thus, only one efficiency definition. The process of evaluation of the ideal temperature rise is given in Appendix B. All of the comments in the fan stream apply here, except that thermal efficiency is not defined here due to the lack of liner cooling air.

If the message "Aerodynamic Loading exceeds Kinetic Capacity" occurs, the blowout limits were exceeded.

#### 4. PROGRAM SETUP

The combined rumble/flameholder combustion model program supplied by Pratt & Whitney Aircraft contains all the subroutines necessary to operate the program, with the exception of systems routines normally supplied by the computer manufacturer. The program is written in Fortran IV and runs on any large scale computer system with little or no modification required. Test case input and output are included to verify successful installation.

On the Pratt & Whitney Aircraft (GPD) IBM 370 Model 168 computer, the program requires approximately 364K bytes of core storage. Run time is approximately 1 second per point.

#### 5. PROGRAM PERFORMANCE OPTIONS

The combined model has options to vary augmentor type, fan splitter type, combustion data source, fuel type and print-out. These options are described below:

#### AUGMENTOR OPTION

The rumble model is designed to simulate three augmentor designs: V-gutter, Vorbix or Swirl.

Input	Sym	bol
-------	-----	-----

#### Description

NAUGOP

If NAUGOP = 1, the rumble model simulates a V-gutter flameholder augmentor.

If NAUGOP = 2, the rumble model simulates a Vorbix augmentor.

If NAUGOP = 3, the rumble model simulates a Swirl augmentor.

#### SPLITTER OPTION

The rumble model is designed to simulate two fan splitter designs: proximate splitter or remote splitter.

#### Input Symbol

#### Description

#### NFSOP

If NFSOP = 1, the rumble model uses a proximate splitter assumption at fan discharge (Fan duct does not communicate with core at fan discharge).

If NFSOP = 2, the rumble model uses a remote splitter assumption at fan discharge (Fan duct communicates with core at fan discharge).

#### COMBUSTION OPTION

The combined model is designed to exercise the rumble model with empirical combustion data or to exercise the rumble model and use combustion data generated by the flameholder combustion model or to exercise the flameholder combustion model only.

T	4	C	1-1
m	put	Sym	DOI

#### Description

#### NCOMOP

If NCOMOP = 1, the program reads in empirical combustion data and executes the rumble model.

If NCOMOP = 2, the program executes the flameholder combustion model to obtain combustion data and executes the rumble model.

If NCOMOP = 3, the program executes only the flameholder combustion mode.

#### FUEL OPTION

The combined model is designed to operate with fuels of different lower heating values.

In	put	SI	m	bol

#### Description

#### **JFUEL**

If JFUEL = 1, the program uses values for JP4 fuel.

If JFUEL = 2, the program uses values for JP5 fuel.

#### PRINT OPTIONS

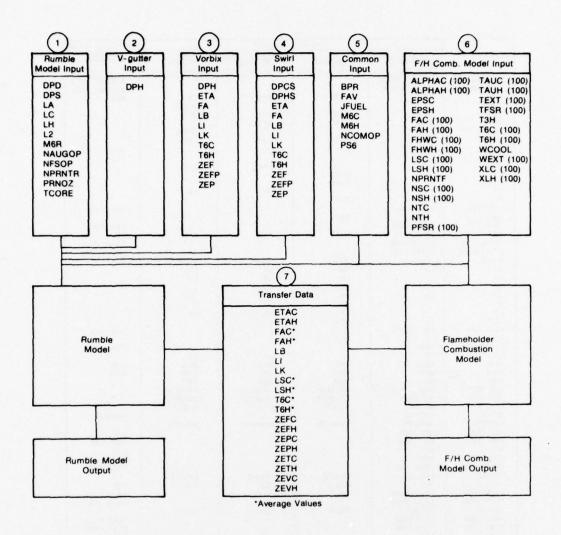
The rumble model provides either tabular and plotted output or just plotted output. The flameholder combustion model provides either limited or full tabular output.

Input Symbol	Description
NPRNTR	If NPRNTR = 0, the program provides both tabular rumble model output and Open Loop Transfer Function plots.
	If NPRNTR = 1, the program provides only Open Loop Transfer Function plots.
NPRNTF	If NPRNTF = 0, the program provides limited flameholder combustion model tabular output.
	If NPRNTF = 1, the program provides full flameholder combustion model tabular output.

#### 6. INPUT

#### a. General

The combined model uses various input parameters depending on which combustion and augmentor options have been selected. An input data flow schematic for the combined model is presented in Figure 14. The chart at the bottom of Figure 14 indicates which data blocks are required for each option selected. Figure 15 lists the input required for each option. Figures 16 and 17 are schematics of the rumble model and flameholder model geometry identification. It should be noted that all input parameters are not required for any given option.



Model Combinations			Combustion	Augmentor	Input Blocks
	Augmentor Type	Combustion Data Source	Option: NCOMOP =	Option: NAUGOP =	Req'd
Rumble Model	V-gutter Flameholder	F/H Comb. Model	2	1	1, 2, 5, 6
Rumble Model	V- gutter Flameholder	Empirical	1	1	1, 2, 5, 7
Rumble Model	Vorbix	Empirical	1	2	1, 3, 5
Rumble Model	Swirt	Empirical	1	3	1, 4, 5
	Flameholder Combustion Mo	del	3		5, 6

Figure 14. Combined Model Input Flow

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	Rumble Model  V-Gutter Vorbix Swirl			F/H Comb. Mode	
Input List			Vorbix	Swirt	V-Gutter
	F/H Model	Empirical Combustion Data	Empirical Combustion Data	Empirical Combustion Data	
ALPHAC (100)	ALPHAC (100)	Combustion Data	Compustion Data	Combustion Data	ALPHAC (100
ALPHAH (100)	ALPHAH (100)				ALPHAH (100
BPR	BPR	BPR	BPR	BPR	BPR
DPCS				DPCS	
DPD	DPD	DPD	DPD	DPD	
DPH	DPH	DPH	DPH		
DPHS				DPHS	
DPS	DPS	DPS	DPS	DPS	
EPSC	EPSC				EPSC
EPSH	EPSH				EPSH
ETA			ETA	ETA	
ETAC		ETAC			
ETAH		ETAH			
FA			FA	FA	
FAC		FAC			
FAC (100)	FAC (100)				FAC (100)
FAH		FAH			
FAH-(100)	FAH (100)				FAH (100)
FAV	FAV	FAV	FAV	FAV	FAV
FHWC (100)	FHWC (100)				FHWC (100)
FHWH (100)	FHWH (100)	ICHE!	JFUEL	ICHE	FHWH (100)
JFUEL	JFUEL	JFUEL	LA	JFUEL	JFUEL
LA	LA	LA		LA	
LB LC	10	LB	LB LC	LB LC	
LH	LC LH	LC LH	LH	LH	
LI	LH	LI	LI	LI	
LK		LK	LK	LK	
LSC		LSC	LN	LN	
LSC (100)	LSC (100)	LSC			LSC (100)
LSH	230 (100)	LSH			200 (100)
LSH (100)	LSH (100)	CON			LSH (100)
L2	L2	L2	L2	L2	
M6C	M6C	M6C	M6C	M6C	M6C
М6Н	М6Н	M6H	М6Н	М6Н	М6Н
M6R	M6R	M6R	M6R	M6R	
NAUGOP	NAUGOP	NAUGOP	NAUGOP	NAUGOP	
NCOMOP	NCOMOP	NCOMOP	NCOMOP	NCOMOP	
NFSOP	NFSOP	NFSOP	NFSOP	NFSOP	
NPRNTF	NPRNTF				NPRNTF
NPRNTR	NPRNTR	NPRNTR	NPRNTR	NPRNTR	
NSC (100)	NSC (100)				NSC (100)
NSH (100)	NSH (100)				NSH (100)
NTC	NTC				NTC
NTH	NTH				NTH
PFSR (100)	PFSR (100)				PFSR (100)
PRNOZ	PRNOZ	PRNOZ	PRNOZ	PRNOZ	000
PS6	PS6	PS6	PS6	PS6	PS6
TAUC (100)	TAUC (100)				TAUC (100)
TAUH (100)	TAUH (100)	TOORE	TCOPE	TCORE	TACH (100)
TCORE	TCORE	TCORE	TCORE	TOORE	TEXT (100)
TEXT (100) TFSR (100)	TEXT (100) TFSR (100)				TFSR (100)
T3H	T3H (100)				T3H
T6C	ion	T6C	T6C	T6C	311
T6C (100)	T6C (100)	100	100	100	T6C (100)
T6H	.50 (100)	Т6Н	Т6Н	Т6Н	100 (100)
T6H (100)	T6H (100)	1011			T6H (100)
WCOOL	WCOOL				WCOOL
WEXT (100)	WEXT (100)				WEXT (100)
ZEF	,,,,,,		ZEF	ZEF	
ZEFC		ZEFC			
ZEFH		ZEFH			
ZEFP			ZEFP	ZEFP	
ZEP '			ZEP	ZEP	
ZEPC		ZEPC			
ZEPH	Market Committee	ZEPH			
ZETC		ZETC			
ZETH		ZETH			
ZEVC		Z3VC			
ZEVH		ZEVH			
XLC (100)	XLC (100)				XLC (100)
XLH (100)	XLH (100)				XLH (100)

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Figure 15. Input List

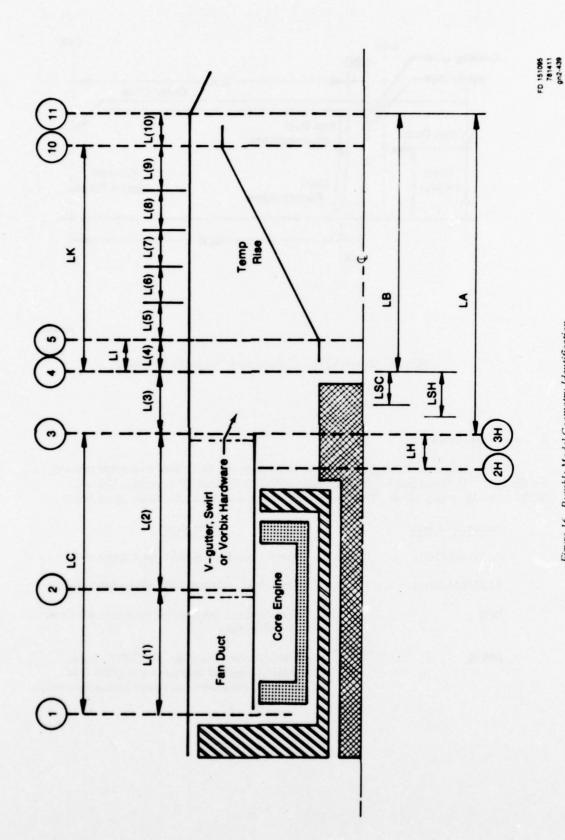
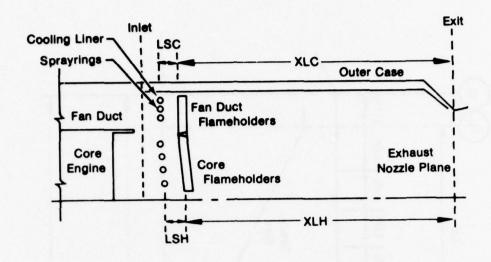


Figure 16. Rumble Model Geometry Identification



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Figure 17. Flameholder Combustion Model Geometry Schematic

# b. Input Description

The program uses "Namelist" input as defined in the applicable computer manual, i.e., for the IBM 370, the manual is IBM Systems 360/370 Fortran IV Language Manual, GC28-6515-10, pages 54-56. The "Namelist" names and descriptions are given below.

Parameter Name	Description
ALPHAC (100)	Fan stream flameholder apex angle, deg.
ALPHAH (100)	Core stream flameholder apex angle, deg.
BPR	Bypass ratio, fan duct air flow/core air flow, dimensionless.
DPCS	Fan side vane pressure loss $(\Delta P/P)$ from mixing plane to ignition plane (STA 3 to STA 4), dimensionless (Swirl augmentor only).

Parameter Name	Description
DPD	Fan duct pressure loss ( $\Delta P/P$ ) allocated to STA 2, dimensionless. Allocate remainder to STA 3; see DPS.
DPH	Pressure loss ( $\Delta P/P$ ) from mixing plane to ignition plane (STA 3 to STA 4), dimensionless. For V-gutter augmentor this accounts for spraybar and flameholder pressure loss. For Vorbix augmentor this accounts for Vortex generator and pilot pressure loss (core and fan combined).
DPHS	Core side vane pressure loss ( $\Delta P/P$ ) from mixing plane to ignition plane (STA 3H to STA 4), dimensionless (Swirl augmentor only
DPS	Fan duct pressure loss ( $\Delta P/P$ ) allocated to STA 3, dimensionless. Allocate remainder to STA 2; see DPD.
EPSC	Fan stream turbulence factor, dimensionless.
EPSH	Core stream turbulence factor, dimensionless.
ЕТА	Augmentor overall combustion efficiency, actual temperature rise/ideal temperature rise, dimensionless.
ETAC	Augmentor fan stream combustion efficiency, actual temperature rise/ideal temperature rise, dimensionless.
ЕТАН	Augmentor core stream combustion efficiency actual temperature rise/ideal temperature rise, dimensionless.
FA	Augmentor overall fuel-air ratio, dimensionless Defined as augmentor total fuel flow/fan stream air flow (STA 3) plus core stream air flow (STA 3H) plus primary engine fuel flow (STA 3H).
FAC	Augmentor fan stream fuel-air ratio, dimensionless. Defined as augmentor fan stream fuel flow/fan stream air flow (STA 3).

Augmentor fuel-air ratio for each individual fan stream flow tube, dimensionless.

FAC (100)

Parameter Name	Description
FAH	Augmentor core stream fuel-air ratio, dimensionless. Defined as augmentor core stream fuel flow/core stream air flow (STA 3H) plus primary engine fuel flow (STA 3H).
FAH (100)	Augmentor fuel-air ratio for each individual core stream flow tube, dimensionless.
FAV	Vitiated fuel-air ratio of core stream at entry to augmentor (STA 3H), dimensionless. Defined as primary engine fuel flow (STA 3H)/core stream air flow (STA 3H).
FHWC (100)	Individual flameholder widths in fan stream, inches.
FHWH (100)	Individual flameholder widths in core stream, inches.
LA	Length of augmentor, mixing plane to nozzle (STA 3 to STA 11), inches.
LB	Distance from ignition plane to nozzle (STA 4 to STA 11), inches.
LC	Length of fan duct, fan discharge to mixing plane (STA 1 to STA 3), inches.
LH	Distance from turbine discharge to mixing plane (STA 2H to STA 3H), inches.
LI	Distance from ignition plane to beginning of combustion zone (STA 4 to STA 5), inches.
LK	Distance from ignition plane to end of combustion zone (STA 4 to STA 10), inches.
LSC	Distance from spraybar to flameholder in fan stream, inches.
LSC (100)	Distance from spraybar to flameholder for each individual streamtube in the fan stream, inches.
LSH	Distance from spraybar to flameholder in core stream, inches.
LSH (100)	Distance from spraybar to flameholder for each individual streamtube in the core

stream, inches.

Parameter Name	Description
L2	Distance from fan duct pressure loss (DPD) to mixing plane (STA 2 to STA 3), inches.
M6C	Fan stream Mach number at entry to augmentor (STA 3), dimensionless. (Must be $\geq 0$ .)
М6Н	Core stream Mach number at entry to augmentor (STA 3H), dimensionless. (Must be $> 0$ .)
M6R	Mach number of mixed augmentor stream flow prior to combustion (STA 4), dimensionless. (Must be $> 0$ .)
NSC (100)	Number of fan stream flow tubes of this type, integer.
NSH (100)	Number of core stream flow tubes of this type, integer.
NTC	Number of streamtube types in the fan flow, integer.
NTH	Number of streamtube types in the core flow, integer.
PFSR (100)	Individual spraybar fuel pressure for each fan flow tube, psia.
PRNOZ	Exhaust nozzle pressure ratio (always > 1.), dimensionless. If nozzle is choked, any value greater than critical value required to choke nozzle (approximately 2.0) may be input. Exact value of PRNOZ is required only if nozzle is unchoked.
PS6	Augmentor static pressure at entry to augmentor (STA 3), psia.
TAUC (100)	Individual streamtube blockage ratio for fan stream, dimensionless.
TAUH (100)	Individual streamtube blockage ratio for core stream, dimensionless.
TCORE	Core engine time constant, mass of air in core engine volume/mass flowrate of air through the core engine, sec.
TEXT (100)	External flow temperature for individual flow tubes in the fan flow, deg. R.

Description Parameter Name TFSR (100) Spraybar fuel temperature for individual flow tubes in the fan flow, deg. R. ТЗН Main burner inlet temperature, deg. R. T<sub>6</sub>C Fan stream temperature at entry to augmentor (STA 3), deg. R. T6C (100) Fan stream temperature at entry to augmentor (STA 3), for individual flow tubes, deg. R. **T6H** Core stream temperature at entry to augmentor (STA 3H), deg. R. T6H (100) Core stream temperature at entry to augmentor (STA 3H), for individual flow tubes, deg. R. WCOOL Ratio of nozzle cooling air to total engine air flow, dimensionless. WEXT (100) External flow ratio for individual flow tubes in the fan stream, dimensionless. XLC (100) Distance from flameholder to nozzle for individual fan stream flow tubes, inches. XLH (100) Distance from flameholder to nozzle for individual core stream flow tubes, inches. ZEF Normalized slope, augmentor overall combustion efficiency vs. overall fuel-air ratio, FA & ETA , dimensionless. ETA OFA ZEFC Normalized slope, augmentor fan stream combustion efficiency vs. fan stream fuel-air ratio, FAC DETAC , dimensionless. ETAC OFAC ZEFH Normalized slope, augmentor core stream combustion efficiency vs. core stream fuel-air ratio, FAH ∂ETAH , dimensionless. ETAH OFAH

pilot burner, FAP ∂ETA

ETA OFAP

Normalized slope, augmentor overall combustion efficiency vs. fuel-air ratio of the

, dimensionless.

ZEFP

1:

Parameter Name	Description
ZEP	Normalized slope, augmentor overall combustion efficiency vs. pressure at ignition plane, $\frac{P}{ETA} \frac{\partial ETA}{\partial P} \text{ , dimensionless.}$
ZEPC	Normalized slope, augmentor fan stream combustion efficiency vs. pressure at ignition plane, $\frac{P}{ETAC} \frac{\partial ETAC}{\partial P} \text{ , dimensionless.}$
ZEPH	Normalized slope, augmentor core stream combustion efficiency vs. pressure at ignition plane, $\frac{P}{ETAH} \frac{\partial ETAH}{\partial P} \ , \ dimensionless.$
ZETC	Normalized slope, augmentor fan stream combustion efficiency vs. fan stream entry temperature, $\frac{T6C}{ETAC} = \frac{\partial ETAC}{\partial T6C} \ , \ dimensionless.$
ZETH	Normalized slope, augmentor core stream combustion efficiency vs. core stream entry temperature, $\frac{T6H}{ETAH} \ \frac{\partial ETAH}{\partial T6H} \ , \ dimensionless.$
ZEVC	Normalized slope, augmentor fan stream combustion efficiency vs. fan stream entry velocity, $\frac{V}{ETAC} \ \frac{\partial ETAC}{\partial V} \ , \ dimensionless.$
ZEVH	Normalized slope, augmentor core stream combustion efficiency vs. core stream entry velocity, $\frac{V}{ETAH} \ \frac{\partial ETAH}{\partial V} \ , \ dimensionless.$

#### c. Input Setup

In addition to the "Namelist" input, the program requires input for: (a) additional optional ratio calculations, (b) output plot selection and format, and (c) frequency range and increment selection. The input setup is shown in Figure 18 and is described below.

- (1) Each input case requires a title card. Column 1 for the first case must contain a 1. The "Namelist" input must be preceded by an & INPUT starting in column 2 and followed by an & END starting in column 2. The "Namelist" input (Columns 2-80) required for each case is presented in Figure 15. Each input must be separated by a comma (see Figure 18). The ratio calculations, plot setup and frequency selection must follow the first input case. For additional input cases, follow the frequency selection cards with a blank card and then the additional title cards and input cases. Only those parameters that differ from the previous case must be input. For the additional input cases, if column 1 of the title card contains a 1, the ratio calculations, plot setup and frequency selection will be the same as the preceding case. If column 1 of the title card contains a 0, new ratio calculations, plot setup and frequency selection may be input.
- (2) Additional ratio calculations may be performed by inputting the parameter identification numbers as indicated in Figure 18. Up to 40 ratios may be calculated and these ratios will automatically be included in the tabular output. The parameter identification numbers are presented in Figure 19. One blank field will terminate this type input. If columns 71-75 are used, a blank card must follow.
- (3) Calcomp plots of any rumble model output parameter may be obtained by inputting one card for each parameter as described below. A maximum of 10 plots may be requested for any case. A blank card must be input to terminate plot requests or if no plots are desired.

Column 1 - 3 - Output Parameter No., right adjusted (integer; no decimal)

Column 11 - 20 — Amplitude Option (decimal required)

Column 21 - 30 — Phase Option (decimal required)

Column 31 - 40 - Frequency Option (decimal required)

Column 41 - 50 — Amplitude Factor (decimal required)

Column 51 - 60 — Frequency Factor (decimal required)

Column 61 - 70 - XMIN (decimal required)

Column 71 - 80 — XMAX (decimal required)

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Figure 18. Combined Rumble Model Input Set-up

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Output Parameter Name	Parameter Identification Number
P1	1
V1	. 2
R1	3
P2	4
V2	5
R2	6
P3	7
V3	8
R3	9
P3H	10
V3H	11
R3H	12
P2H	13
V2H	14
R2H	15
QIN	16
W3	17
W3H	18
QOUT	19
P4	20
V4	21
R4	22
P5	23
V5	24
R5	25
P6	26
V6	27
R6	28
P7	29
V7	30
R7	31
P8	32
V8	33
R8	34
P9	35
V9	36
R9	37
P10	38
V10	39
R10	40
P11	41
V11	42
R11	43

Note: P1 = P1/Q<sub>IN</sub> =  $(\Delta P_1/P_1)/(\Delta Q_{IN}/Q_{IN})$  Same for Other Output Parameters

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Figure 19. Parameter Identification Numbers

# • Output Parameter No.

A list of output parameter identification numbers is presented in Figure 19. If any of the additional ratio calculations (described above) are to be plotted, parameter identification numbers starting at 101 and incremented by 1 are used. The parameter identification numbers must be right adjusted in columns 1-3.

### Amplitude Option

If Amplitude Option = 0., Log (amplitude) will be plotted. If Amplitude Option = 1., Amplitude will be plotted.

### Phase Option

If Phase Option = 0., Phase angle of 0 to -360 will be plotted. If Phase Option = 1., Phase angle of 180 to -180 will be plotted.

## Frequency Option

If Frequency Option = 0., Log (Frequency) will be plotted. If Frequency Option = 1., Frequency will be plotted.

## · Amplitude Factor

If Amplitude Option = 0., the Amplitude Factor must be input as a number which could be written as  $10^N$ , where N = (±) integer. Log (Amplitude Factor) will be added to the base Log amplitude scale, where the base Log amplitude scale ranges from -1.0 to 2.0.

If Amplitude Option = 1., the Amplitude Factor becomes a multiplier for the base amplitude scale, where the base amplitude scale ranges from 0. to 3.0.

### • Frequency Factor

If Frequency Option = 0., the Frequency Factor must be input as a number which could be written as  $10^N$ , where N = ( $\pm$ ) integer. Frequency factor will be a multiplier for the base frequency scale, where the base frequency scale ranges from .1 to 100.

If Frequency Option = 1., the Frequency Factor will be a multiplier for the base frequency scale, where the base frequency scale ranges from 0. to 100., unless XMIN and XMAX are input. XMIN is the minimum value for the frequency scale when Frequency Option = 1. XMAX is the maximum value for the frequency scale when Frequency Option = 1. If either Amplitude Factor or Frequency Factor is input at 0. when XMIN and XMAX are input, the program automatically sets Amplitude Factor or Frequency Factor to 1.

- (4) The frequencies used in the program calculations are input in two parts. First, there are three cards which contain the minimum frequency, increment and maximum frequency (see Figure 18). The increment is used to determine each frequency for the range defined. Additional independent frequencies (up to 500 values) may be input in fields of 10, 7 fields per card. A field containing -1. will terminate this input. If the 7th field of the last card is used, an additional card with -1. in the first field is required.
- (5) The rumble model has been set up to model a turbofan engine with a mixed flow augmentor. To model a turbojet (no fan), set BPR = 0 and NFSOP = 1. To model a fan duct augmentor (separate fan and core flows), set BPR =  $10^{10}$  and NFSOP = 1.

### 7. OUTPUT

#### a. General

The program output is presented in two parts: (1) rumble model output and (2) flameholder combustion model output. There are two rumble model output options: (1) NPRNTR = 0, the program provides both rumble model tabular output and Open Loop Transfer Function plots or (2) NPRNTR = 1, the program provides only Open Loop Transfer Function plots. There are also two flameholder combustion model output options: (1) NPRNTF = 0, the program provides limited flameholder combustion model tabular output and (2) NPRNTF = 1, the program provides full flameholder combustion model tabular output.

### b. Output Description

(1) Rumble model tabular output (listed in the order they appear):

Parameter(s)	Description
NAMELIST INPUT	The "namelist" input parameters and the values input are listed for verification.
KNOZ	A parameter that relates the influence of pressure at STA 11 on velocity at STA 11, dimensionless.
FAAB	Augmentor overall fuel-air ratio, dimensionless.
ETAAB	Augmentor overall efficiency, dimensionless.
DTIAB	Augmentor overall ideal temperature rise, deg. R.
DTAB	Augmentor overall actual temperature rise, deg. R.
т6м	Augmentor mixed temperature before combustion (STA 3), deg. R.

Parameter(s)	Description
TKC	Augmentor mixed exhaust temperature (STA 10), deg. R.
XLHV	Lower heating value for the fuel selected, Btu/lbm.
DTC	Fan stream temperature rise, deg. R.
QCQT	Fraction of total heat release contributed to fan stream, dimensionless.
DTIC	Fan stream ideal temperature rise, deg. R.
TAUDC	Fan stream drift delay from spraybar to flameholder, sec.
DTH	Core stream temperature rise, deg. R.
QHQT	Fraction of total heat release contributed by core stream, dimensionless.
DTIH	Core stream ideal temperature rise, deg. R.
TAUDH	Core stream drift delay from spraybar to flameholder, sec.
ZTFC	Normalized slope, augmentor fan stream ideal temperature rise vs. fan stream fuelair ratio, $\frac{FAC}{DTIC} \ \frac{\partial DTIC}{\partial FAC} \ , \ dimensionless.$
ZTFH	Normalized slope, augmentor core stream ideal temperature rise vs. core stream fuelair ratio, $\frac{FAH}{DTIH} \frac{\partial DTIH}{\partial FAH} \text{ , dimensionless.}$
L (1-11)	Distance between model stations, inches.
YL (1-11)	Station locations references to STA 1, inches.
C (1-11)	Velocity of sound at each station, in./sec.
СН	Velocity of sound in core stream at STA 3H, in./sec.
M (1-11)	Mach number at each station, dimensions.

Description
Mach number in core stream at STA 3H, dimensionless.
Temperature at each station, deg. R.
Temperature in core stream at STA 3H, deg. R.
Pressure drop through combustion zone (STA 5 - STA 10), psia.
Ratio of specific heats at each station, dimensionless.
Ratio of specific heats in core stream at STA 3H, dimensionless.
Time delays for downstream running sonic waves between stations, sec.
Time delay for downstream running sonic wave between STA 2H and 3H, sec.
Time delays for upstream running sonic waves between stations, sec.
Time delay for upstream running sonic wave between STA 2H and 3H, sec.
Time delays for downstream running entropy waves between stations, sec.
Time delay for downstream running entropy wave between STA 2H and 3H, sec.
Ratio of volumetric heat release rate at each station to pressure at each station, 1/sec.

- (2) Rumble model Open Loop Transfer Function plots. Each plot consists of Open Loop Transfer Function Gain versus frequency and phase angle versus frequency for the parameters selected.
- (3) Flameholder combustion model full tabular output.

Parameter(s)	Description	
Fan Stream	Identifies following sections as fan duct output.	
Streamtube type	Identifies for this set of input variables.	
No. of this type	The number of streamtubes with this set of input variables.	

Parameter(s)	Description

Static Pressure (PS6) Inlet static pressure, psia.

Approach Temperature (T6C) Inlet temperature, deg. R.

Approach Mach No. (M6C) Inlet flow Mach No., d'less.

Input FA Ratio (FAC) Inlet fuel-air ratio, d'less.

Effective FA Ratio Effective fuel-air ratio accounting for liner

cooling air flow.

F/H Width (FHWC) Flameholder width, inches.

Blockage Ratio (TAUC) Ratio of flameholder width to streamtube

width, d'less.

F/H Apex Angle (ALPHAC) V-gutter flameholder apex angle, degrees.

S/R Fuel Temperature (TFSR) Temperature of the fuel within sprayring,

deg. R.

S/R Fuel Pressure (PFSR) Pressure of the fuel within the sprayring, psia.

S/R to F/H Distance (LSC) Axial separation distance between the spray-

ring and the flameholder, inches.

F/H to Nozzle Distance (XLC) Axial distance from the flameholder to the

exhaust nozzle throat, inches.

Turbulence Level (EPSC) Ratio of RMS turbulence velocity to the

approach velocity at the inlet, d'less.

Wake Flow Addition (WEXT) Ratio of external wake flow to recirculated

flow, d'less.

Flow Source Temperature (TEXT) Temperature of above flow, deg. R.

Effective Inlet Temperature Mass average of WEXT flow at TEXT and

recirculated flow at T6C, deg. R.

Fuel Type (JFUEL) Identifies for fuel

1 = JP42 = JP5

Mean droplet size

The mass median droplet size produced by

the injector, microns.

Flash vaporization Fraction of the liquid fuel which is vaporized

by injection from PFSR to PS6, d'less.

Parameter(s)

Description

Beta 1

Droplet vaporization fraction.

Beta 2

Droplet collection fraction.

Beta 3

Surface vaporization fraction.

K1

Recirculation fraction.

Wake FA

Flameholder wake vapor phase fuel-air

ratio, d'less.

Wake temperature

Reaction temperature in the flameholder

wake, deg. R.

Initial speed

Laminar flame speed at the flameholder,

ft/sec.

Initial turbulence

Turbulence intensity at the flameholder, d'less.

Ideal temperature rise

Ideal temperature rise for effective fuel-air

ratio, deg. R.

Efficiency

Streamtube combustion efficiency; ratio of flame penetration to streamtube width, d'less.

Actual temperature rise

Efficiency times ideal temperature rise,

deg. R.

Exit temperature

Streamtube exit temperature without liner

cooling air, deg. R.

Flowrate - air

Air flowrate for this streamtube, lbm/sec.

Flowrate - fuel

Fuel flowrate for this streamtube, lbm/sec.

Cooling flow/total engine

flow (WCOOL)

Ratio of liner cooling air flowrate to total

engine flowrate, d'less.

Chemical combustion efficiency

Average efficiency based on average streamtube exit temperature and average effective

fuel-air ratio, d'less.

Thermal combustion efficiency

Average efficiency based on streamtube average exit temperature plus cooling air

and average input fuel-air ratio, d'less.

Average cooling air temperature

Mass averaged inlet temperature used for

cooling, deg. R.

Average streamline exit

temperature

Mass average of the streamtubes without

cooling air, deg. R.

# Parameter(s)

# Description

Average duct exit temperature Mass average of streamtubes plus cooling

air, deg. R.

Total flowrate Total of each streamtube type times the

number of each type, lbm/sec.

Average fuel-air ratio Mass average of the input fuel-air ratios.

Core Stream Identified following sections as core

stream output.

Wake recirculation coefficient Same as K1 in fan duct, d'less.

Ideal temperature rise Ideal temperature rise based on input

fuel-air ratio and main burner fuel-air

ratio. See Appendix B.

M/B Fuel-air ratio Fuel-air ratio of the vitiated air entering

the core streamtubes.

M/B Inlet temperature Inlet temperature to the main burner, d'less.

Average distance from spraybar Average axial distance from the spraybars

to F/H to the flameholders, inches.

Note: Any core stream parameters which are not listed above have the same definition as their fan stream counterpart.

# (4) Flameholder combustion model limited tabular output.

Parameter(s)	Description

Fan stream Identifies following as fan stream cases input

and output.

Inlet temperature (T6C) Streamtube inlet temperature, deg. R.

Fuel-air ratio (FAC) Input fuel-air ratio, d'less.

Average inlet temperature Mass averaged inlet temperature, deg. R.

Ideal temperature rise Streamtube ideal temperature rise based

on effective fuel-air ratio, deg. R.

Combustion efficiency Streamtube combustion efficiency, d'less.

Exit temperature Streamtube exit temperature based on

effective fuel-air ratio, deg. R.

input fuel-air ratio, deg. R.

# Parameter(s) Description Average combustion efficiency Efficiency based on average ideal temperature rise with cooling air effect included, d'less. Average exit temperature Exit temperature including cooling air, deg. R. Core Stream Identifies following as core stream section. Mach No. Streamtube inlet flow Mach number, d'less. Average ideal temperature rise Ideal temperature rise based on average input fuel-air ratio, deg. R. Average combustion efficiency Efficiency based on average temperature rise and average ideal temperature rise, d'less. Average exit temperature Exit temperature based on mass averaged actual temperature rise, deg. R.

### 8. PROGRAM MESSAGES AND LIMITS

### a. Input Checks

The program checks all inputs to see if the inputs are missing or equal the default values built into the deck. Missing inputs are set equal to the default values. A warning message (presented below) is printed to alert the user if default input values are identified. The program also checks specific inputs to ensure reasonable input data. If these checks are not satisfied, the run will be canceled. These checks and corresponding print-out messages are presented below:

Condition	Message
Input value = default value or no input for certain parameter	WARNING — PARAMETER XXXXXX = YYY.Y is a default value
${ m LA}<{ m LB},$ where LK and LB are Rumble Model Inputs	INPUT ERROR $1-\mathrm{LA}$ must be greater than or equal to LB
LK > LB, where LK and LB are Rumble Model Inputs	INPUT ERROR $2-LB$ must be greater than or equal to LK
LA < LCALC, where LCALC = LB + MAX (LSC, LSH)	INPUT ERROR 3—LA must be greater than or equal to the sum of LB plus the max of LSC or LSH. LA has been adjusted accordingly. Check input.
LI ≥ LK	INPUT ERROR $4-LI$ must be less than LK.
LC < L2	INPUT ERROR $5-LC$ must be greater than or equal to $L2$

Condition	Message
ETA < 0  or  > 1.	INPUT ERROR $6 - \text{ETA}$ must be between 0 and 1.
ETAC < 0  or  > 1.	INPUT ERROR $7 - \text{ETAC}$ must be between 0 and 1.
ETAH < 0  or  > 1.	INPUT ERROR 8 — ETAH must be between 0 and 1.
(FAC + FAH) = 0	INPUT ERROR $9 - \text{FAC}$ and FAH cannot both be zero with augmentor on.
$\begin{bmatrix} FAV + (1 + FAV) FAH \end{bmatrix}$ $\begin{bmatrix} \frac{XLHV}{18500.} \end{bmatrix} \ge .09$ or if (FAC) $\begin{bmatrix} \frac{XLHV}{18500.} \end{bmatrix} \ge .09$	INPUT ERROR $10$ — Core of fan stream totoal fuel-air ratio exceeds limits of ideal temperature rise curve. Blowout likely.
NFSOP = $2$ and BPR = $0$ .	INPUT ERROR $11 - \text{BPR}$ cannot be zero when the remote flow splitter option is selected.
DPCS < 0  or  > 1.	INPUT ERROR $12 - DPCS$ must be between 0 and 1.
DPD < 0  or  > 1.	INPUT ERROR $13 - \text{DPD}$ must be between 0 and 1.
DPH < 0  or  > 1.	INPUT ERROR $14 - \text{DPH}$ must be between 0 and 1.
DPHS < 0  or  > 1.	INPUT ERROR $15-$ DPHS must be between 0 and 1.
DPS < 0  or  > 1.	INPUT ERROR $16 - \text{DPS}$ must be between 0 and 1.
T3H ≥ 2200.	INPUT ERROR $17 - \text{T3H}$ exceeds limits of ideal temperature rise curve. T3H must be less than 2200. deg-R.
BPR < 0.	INPUT ERROR $18 - BPR$ must be equal to or greater than $0$ .

FAV < 0.

NAUGOP  $\leq 0$ . or > 3.

INPUT ERROR 19 - FAV must be equal to or greater than 0.

 $\begin{array}{l} {\rm INPUT~ERROR~20-NAUGOP~must~be} \\ {\rm 1,~2~or~3.} \end{array}$ 

Condition	Messages
$NFSOP \le 0 \text{ or } > 2.$	INPUT ERROR $21 - NFSOP$ must be 1 or 2.
NCOMOP $\leq 0$ or $> 3$ .	INPUT ERROR 22 — NCOMOP must be 1, 2 or 3.
$JFUEL\leqslant 0 \ or >2.$	INPUT ERROR $23 - $ JFUEL must be 1 or 2.
NPRNTR < 0  or  > 1.	INPUT ERROR $24 - NPRNTR$ must be $0$ or $1$
NPRNTF < 0  or  > 1.	INPUT ERROR $25-$ NPRNTF must be 0 or 1.
$M6C \leqslant 0$	INPUT ERROR $26 - M6C$ must be greater than $0$ .
$M6H \leqslant 0$	INPUT ERROR $27 - M6H$ must be greater than $0$ .
$M6R \leqslant 0$	INPUT ERROR $28-M6R$ must be greater than $0$ .
LI < 0	INPUT ERROR $29 - \text{LI}$ must be equal to or greater than $0$ .
LK ≤ 0	INPUT ERROR $30 - LK$ must be greater than $0$ .
$LA \leq 0$	INPUT ERROR $31 - \text{LA}$ must be greater than $0$ .
$LB \leq 0$	INPUT ERROR $32 - LB$ must be greater than $0$ .
$LC \le 0$	INPUT ERROR $33 - LC$ must be greater than $0$ .
$LSC \leq 0 \text{ or } \geq LA$	INPUT ERROR $34 - \mathrm{LSC}$ must be greater than 0 and less than LA.
$LSH \leq 0 \text{ or } \geq LA$	INPUT ERROR $35 - \text{LSH}$ must be greater than 0 and less than LA.
LH ≤ 0	INPUT ERROR $36 - LH$ must be greater than $0$ .
L2 < 0	INPUT ERROR $37 - L2$ must be greater than or equal to 0.
TCORE < 0	INPUT ERROR $38 - \text{TCORE}$ must be equal to or greater than $0$ .

Condition	Messages
PS6 ≤ 0	INPUT ERROR $39 - PS6$ must be greater than $0$ .
T6C ≤ 0	INPUT ERROR $40 - \text{T6C}$ must be greater than $0$ .
T6H ≤ 0	INPUT ERROR $41 - T6H$ must be greater than $0$ .
T3H ≤ 460.	INPUT ERROR $42 - T3H$ must be greater than $460$ .
FA < 0	INPUT ERROR $43 - FA$ must be greater than or equal to $0$ .
FAC < 0	INPUT ERROR $44 - FAC$ must be greater than or equal to $0$ .
FAH < 0	INPUT ERROR $45 - \text{FAH}$ must be greater than or equal to $0$ .
$PRNOZ \leq 1$	INPUT ERROR $46 - PRNOZ$ must be greater than 1.
ALPHAC (100) ≤ 0 or > 180	INPUT ERROR $47 - \text{ALPHAC}$ must be greater than 0 and less than or equal to 180 deg.
ALPHAH (100) ≤ 0 or > 180	INPUT ERROR $48 - ALPHAH$ must be greater than 0 and less than or equal to 180 deg.
$\mathrm{EPSC} < 0 \; \mathrm{or} > 1$	INPUT ERROR $49 - \text{EPSC}$ must be greater than or equal to zero and less than or equal to 1.
EPSH < 0  or  > 1	INPUT ERROR $50-$ EPSH must be greater than or equal to zero and less than or equal to 1.
FAC $(100) \le 0$	INPUT ERROR $51 - \text{FAC}$ must be greater than zero.
FAH (100) ≤ 0	$\begin{array}{l} {\rm INPUT\;ERROR\;52-FAH\;must\;be\;greater} \\ {\rm than\;zero.} \end{array}$
FAV > .068	INPUT ERROR $53 - \text{FAV}$ cannot exceed stoichiometric (.068).
FHWC (100) ≤ 0.	INPUT ERROR $54-$ FHWC must be greater than zero.

Condition	Messages
FHWH (100) ≤ 0.	INPUT ERROR $55 - FHWH$ must be greater than zero.
LSC $(100) \le 0$ or $\ge LA$	INPUT ERROR $56-\mathrm{LSC}$ must be greater than zero and less than LA.
LSH $(100) \le 0$ or $\ge LA$	INPUT ERROR $57-$ LSH must be greater than zero and less than LA:
$\frac{\text{M6C}}{1 - \text{TAUC (100)}} > 1.$	INPUT ERROR 58 — Flow is supersonic in fan stream at the flameholder plane.
$\frac{\text{M6H}}{1 - \text{TAUH (100)}} > 1.$	INPUT ERROR 59 — Flow is supersonic in core stream at the flameholder plane.
NSC $(100) < 0$ or $> 100$ .	INPUT ERROR $60 - \mathrm{NSC}$ must be greater than or equal to zero and less than or equal to 100.
NSH $(100) < 0$ or $> 100$ .	INPUT ERROR $61 - \text{NSH}$ must be greater than or equal to zero and less than or equal to 100.
NTC < 0  or  > 100.	INPUT ERROR $62-$ NTC must be greater than or equal to zero and less than or equal to $100$ .
NTH < 0  or  > 100.	INPUT ERROR $63-$ NTH must be greater than or equal to zero and less than or equal to $100$ .
PFSR (100) ≤ PS6	INPUT ERROR $64 - PFSR$ must be greater than PS6.
TAUC (100) $\leq 0$ or $\geq 1$ .	INPUT ERROR $65 - \text{TAUC}$ must be greater than 0 and less than 1.
TAUH (100) $\leq 0 \text{ or } \geq 1$ .	INPUT ERROR $66 - \text{TAUH}$ must be greater than 0 and less than 1.
TEXT (100) < 460.	INPUT ERROR $67 - \text{TEXT}$ must be greater than or equal to $460$ .
TFSR (100) < 460.	INPUT ERROR $68 - \text{TFSR}$ must be greater than or equal to $460$ . deg. R.
T6C (100) ≤ 460.	INPUT ERROR 69 — T6C must be greater than 460.
T6H (100) ≤ 460.	INPUT ERROR $70 - T6H$ must be greater than $460$ .
WEXT (100) < 0	INPUT ERROR $71 - \text{WEXT}$ must be greater than or equal to zero.

Condition	Messages
$XLC(100) \le 0$	INPUT ERROR $72 - \text{XLC}$ must be greater than zero.
XLH (100) ≤ 0	INPUT ERROR $73 - XLH$ must be greater than zero.
$WCOOL < 0 \text{ or } \ge 1$	INPUT ERROR 74 - WCOOL must be

greater than or equal to 0. and less than 1.

Calculation Failure Messages for Flameholder Combustion Model

The Flameholder Combustion Model program checks for specific calculation failures. The causes and corresponding messages are presented below:

Message	Cause
Warning *** wake temperature iteration failed for streamtube No. XX	The calculated value of the fan duct flame- holder wake fuel-air ratio exceeds the rich limit at the inlet conditions for this stream- tube. This streamtube case has failed.
Aerodynamic loading exceeds kinetic capacity	The inlet values of velocity, pressure, and temperature produce a wake loading which exceeds the reaction limit at this fuel-air ratio. This streamtube case has failed.
All fuel vaporizedterminate case	The injection process has resulted in only vapor fuel. Run this input as a core case if desired.
Overall fuel-air ratio below lean limit	The input fuel-air ratio is less than the calculated minimum value for flame propagation in the fan stream.
FAR outside flammability limits	The input fuel-air ratio is outside the limits of the data for laminar flame speed built into the program. Currently set at .027 lean and .120 rich limit fuel-air ratios.

# 9. PROGRAM LISTINGS

Listings of the computer program formulation are provided in Appendix C.

10. TEST CASES

The test cases are provided in Appendix D as outlined below:

Test Case	Model	Augmentor	Flow Splitter	Combustion Data Source	<u>Fuel</u>	Rumble Output	F/H Comb. Output
1	Rumble	V-gutter F/H	Proximate	Flameholder Comb. Model	JP4	Tab & Plot	Full Tab
2	Rumble	V-gutter F/H	Remote	Flameholder Comb. Model	JP4	*	
3	Rumble	V-gutter F/H	Proximate	Empirical	JP4	*	
4	Rumble	V-gutter F/H	Remote	Empirical	JP4	Tab & Plot	Spyrit Disease
5	Rumble	V-gutter F/H	Proximate	Empirical	JP5	*	-
6	Rumble	V-gutter F/H	Proximate	Empirical	JP4	*	goud <del>.</del>
7	Rumble	Vorbix	Proximate	Empirical	JP4	*	- 01325.
8	Rumble	Vorbix	Remote	Empirical	JP4	Tab & Plot	_
. 9	Rumble	Swirl	Proximate	Empirical	JP4	Tab & Plot	III.
10	Rumble	Swirl	Remote	Empirical	JP4	*	4.6.T
11	Flameholder Combustion	V-gutter F/H	and the second	_	JP4	-	Full Tab
12	Flameholder Combustion	V-gutter F/H	idaye sastiala	mod magness	JP5		*
13	Flameholder Combustion With Wake Heat Addition	V-gutter F/H	-	-	JP4	_	*

<sup>\*</sup>Copy of output deleted due to similarity with other output.

### 11. PROGRAM IDENTIFICATION AND REVISION PROCEDURE

## a. CCD Number

Customer Computer Decks (CCD's) are identified by a CCD number and date. An example is CCD 1001-0.0 November 15, 1969.

The CCD number consists of:

- Basic number (first four digits)
- Dash (or change) number
- Decimal (or addition/correction) number.

### (1) Basic Number

This four-digit number generally corresponds to a given program. If another method is developed or studied which does not replace or supersede the original, a new four-digit number is issued.

### (2) Dash Number

Major changes in the program are reflected in different dash numbers. A change in techniques or mathematical methods would produce a new dash number provided the new techniques replace or change the old techniques. For more than nine changes, the dash number shifts to letters. The dash number of the original program is zero.

#### (3) Decimal Number

The decimal is used for all other program changes such as:

- Adding new optional routines
- A change to the FORTRAN source language due to computer differences
- · Correcting a mistake in the program
- · Input and output changes
- Adding unique customer oriented curves or initialization data.

In most cases a decimal number change is made and documented by writing an addendum to the user's manual without reprinting the user's manual. An errata or addendum to the user's manual is used in conjunction with a Computer Simulation Change Notice, (Figure 20). This notice briefly describes the changes affecting the deck and manual.

Accompanying the notice is a new manual title page reflecting the new date and/or dash or decimal changes. The SCN also includes the change pages with black bars in the right-hand margin opposite data changed and a new date in the upper right-hand corner.

Programs revised by the user without written consent of the supplier are the responsibility of the user.

Engine or Component Designation	Date
User's Manual No.	Customer Computer Deck No.
Deck and User's Designation is Changed to:	
Dated:	
Change Nature: Errata Addendum	Changes Effect: Deck Manual
Change:	Reason:
Detailed Reasons for Changes are Shown in Enclosure	
Approval:	
Program Office	
Systems Stability and Control  C. H. Borgmeyer	

Figure 20. Computer Simulation Change Notice

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#### APPENDIX A

#### DEVELOPMENT OF RUMBLE MODEL EQUATIONS

#### 1. DEVELOPMENT OF ACOUSTIC EQUATIONS

In this section equations are developed to describe how velocity, pressure and density at every point in the augmentor respond to a combustion disturbance, which is treated as a heat input to a flowing invicid ideal gas stream. Knowing how these three parameters (velocity, pressure, density) respond allows calculation of any other parameter needed, such as mass flowrate or temperature. The first equations to be developed are the three longitudinal wave equations, which are applicable between boundaries and discontinuities. Then equations for the boundaries and discontinuities are developed. The wave equations plus the boundary and discontinuity equations are referred to as the "acoustic" equations. The "combustion" equations needed to complete the rumble model are developed in paragraph 2 of this appendix.

Symbols used below are defined in the list of symbols. For any section of augmentor with rigid walls and constant cross-sectional area, such as shown in Figure 21, through which an invicid fluid (viscosity is zero) is flowing, the one-dimensional momentum, continuity and energy equations are:

$$\frac{\partial \mathbf{P}}{\partial \mathbf{x}} + \rho \mathbf{V} \frac{\partial \mathbf{V}}{\partial \mathbf{x}} + \rho \frac{\partial \mathbf{V}}{\partial \mathbf{t}} = 0$$

$$\rho \frac{\partial \mathbf{V}}{\partial \mathbf{x}} + \mathbf{V} \frac{\partial \rho}{\partial \mathbf{x}} + \frac{\partial \rho}{\partial \mathbf{t}} = 0$$

$$\mathbf{q} + \frac{\mathbf{P}\mathbf{V}}{\rho} \frac{\partial \rho}{\partial \mathbf{x}} + \frac{\mathbf{P}}{\rho} \frac{\partial \rho}{\partial \mathbf{t}} = \rho \mathbf{V} \frac{\partial \mathbf{u}}{\partial \mathbf{x}} + \rho \frac{\partial \mathbf{u}}{\partial \mathbf{t}}$$
(1)

For an ideal gas, these equations reduce to the following non-linear wave equations:

$$(V+C) \left[ \frac{1}{P} \frac{\partial P}{\partial x} + \frac{\gamma}{C} \frac{\partial V}{\partial x} \right] + \left[ \frac{1}{P} \frac{\partial P}{\partial t} + \frac{\gamma}{C} \frac{\partial V}{\partial t} \right] = (\gamma - 1) \frac{q}{P}$$

$$(V-C) \left[ \frac{1}{P} \frac{\partial P}{\partial x} - \frac{\gamma}{C} \frac{\partial V}{\partial x} \right] + \left[ \frac{1}{P} \frac{\partial P}{\partial t} - \frac{\gamma}{C} \frac{\partial V}{\partial t} \right] = (\gamma - 1) \frac{q}{P}$$

$$V \left[ \frac{1}{P} \frac{\partial P}{\partial x} - \frac{\gamma}{\rho} \frac{\partial \rho}{\partial x} \right] + \left[ \frac{1}{P} \frac{\partial P}{\partial t} - \frac{\gamma}{\rho} \frac{\partial \rho}{\partial t} \right] = (\gamma - 1) \frac{q}{P}$$

$$(2)$$

The wave equations are linearized by the small perturbation substitutions:

$$P(\mathbf{x},t) = \dot{P}(\mathbf{x}) + \Delta P(\mathbf{x},t)$$

$$\rho(\mathbf{x},t) = \dot{\rho}(\mathbf{x}) + \Delta \rho(\mathbf{x},t)$$

$$C(\mathbf{x},t) = \dot{C}(\mathbf{x}) + \Delta C(\mathbf{x},t)$$

$$V(\mathbf{x},t) = \dot{\nabla}(\mathbf{x}) + \Delta V(\mathbf{x},t)$$

$$q(\mathbf{x},t) = \dot{q}(\mathbf{x}) + \Delta q(\mathbf{x},t)$$
(3)

Second order terms are neglected in making the substitutions.

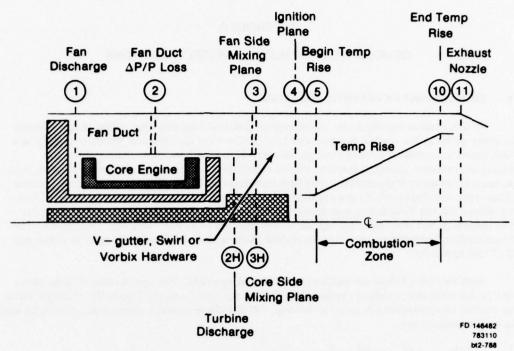


Figure 21. Rumble Model Station Identification

To simplify notation, the following substitutions are made which normalize the change in each variable by its steady-state value:

$$P' = \frac{\Delta P}{\bar{P}}, V' = \frac{\Delta V}{\bar{V}}, \rho' = \frac{\Delta \rho}{\bar{\rho}}, q' = \frac{\Delta q}{\bar{q}}$$
(4)

The linearized version of equations (2) becomes:

$$(\tilde{\nabla} + \tilde{\mathbf{C}}) \frac{\partial}{\partial \mathbf{x}} \left[ \mathbf{P}' + \gamma \tilde{\mathbf{M}} \mathbf{V}' \right] + \frac{\partial}{\partial \mathbf{t}} \left[ \mathbf{P}' + \gamma \tilde{\mathbf{M}} \mathbf{V}' \right] + (\gamma - 1) \frac{\tilde{\mathbf{q}}}{\tilde{\mathbf{p}}} \beta_{\tilde{\mathbf{p}}}' = (\gamma - 1) \frac{\tilde{\mathbf{q}}}{\tilde{\mathbf{p}}'} q'$$

$$(\tilde{\nabla} - \tilde{\mathbf{C}}) \frac{\partial}{\partial \mathbf{x}} \left[ \mathbf{P}' - \gamma \tilde{\mathbf{M}} \mathbf{V}' \right] + \frac{\partial}{\partial \mathbf{t}} \left[ \mathbf{P}' - \gamma \tilde{\mathbf{M}} \mathbf{V}' \right] + (\gamma - 1) \frac{\tilde{\mathbf{q}}}{\tilde{\mathbf{p}}} \beta_{\tilde{\mathbf{q}}}' = (\gamma - 1) \frac{\tilde{\mathbf{q}}}{\tilde{\mathbf{p}}} q'$$

$$(5)$$

$$\tilde{\nabla} \frac{\partial}{\partial \mathbf{x}} \left[ \mathbf{P}' - \gamma \rho' \right] + \frac{\partial}{\partial \mathbf{t}} \left[ \mathbf{P}' - \gamma \rho' \right] + (\gamma - 1) \frac{\tilde{\mathbf{q}}}{\tilde{\mathbf{p}}} \beta_{\tilde{\mathbf{k}}}' = (\gamma - 1) \frac{\tilde{\mathbf{q}}}{\tilde{\mathbf{p}}} q'$$

where:

$$\beta_{F}' = \frac{1}{(1-\bar{M}^{2})} \left[ P'(1-\bar{M}-\bar{M}^{2}) + \rho'\bar{M} + V' \left\{ \frac{1}{2} + \frac{3}{2} \bar{M}-\bar{M}^{2} \left[ 1 + (1+\bar{M}) \frac{\gamma}{2} \right] \right\} \right]$$

$$\beta_{G}' = \frac{1}{(1-\bar{M}^{2})} \left[ P'(1+\bar{M}-\bar{M}^{2}) + \rho'\bar{M} + V' \left\{ \frac{1}{2} - \frac{3}{2} \bar{M}-\bar{M}^{2} \left[ 1 + (1-\bar{M}) \frac{\gamma}{2} \right] \right\} \right]$$

$$\beta_{E}' = P' + V'$$

Taking the Laplace transform with respect to time, with zero initial conditions, and letting subscripts 1 and 2 stand for the upstream and downstream stations respectively (see Figure 21), the general solution to equations (5) becomes:

$$[P_{2}' + \gamma \bar{M}_{2}V_{2}'] e - [P_{1}' + \gamma \bar{M}_{1}V_{1}'] + \frac{(\gamma - 1)}{S} \int_{0}^{\ell} \frac{\tilde{q}}{P} \beta_{F}'(x,s) \frac{d}{dx} e dx$$

$$= \frac{(\gamma-1)}{S} \int_{0}^{t} \frac{\tilde{q}}{P} \ q'(x,s) \ \frac{d}{dx} \ e^{-s \int_{0}^{x} \frac{dx}{V+C}} \ dx$$
 
$$s \int_{0}^{t} \frac{dx}{V-C} - \gamma \bar{M}_{2} V_{2}' \right] e^{-s \int_{0}^{t} -\gamma \bar{M}_{1} V_{1}' + \frac{(\gamma-1)}{S} \int_{0}^{t} \frac{\tilde{q}}{P} \ \beta_{G}'(x,s) \ \frac{d}{dx} \ e^{-s \int_{0}^{x} \frac{dx}{V-C}} \ dx$$

$$= \frac{(\gamma - 1)}{S} \int_{0}^{\ell} \frac{\tilde{q}}{P} q'(\mathbf{x}, \mathbf{s}) \frac{d}{d\mathbf{x}} e^{\int_{0}^{\mathbf{x}} \frac{d\mathbf{x}}{V - C}} d\mathbf{x}$$
(7)

$$[P_{2}' - \gamma \rho_{2}'] e - [P_{1}' - \gamma \rho_{2}'] + \frac{(\gamma - 1)}{S} \int_{0}^{\infty} \frac{\tilde{q}}{P} \beta_{E}'(x,s) \frac{d}{dx} e dx$$

$$= \frac{(\gamma - 1)}{S} \int_{0}^{t} \frac{\bar{q}}{P} q'(x,s) \frac{d}{dx} e^{s \int_{0}^{x} \frac{dx}{V}} dx$$

In equations (7) the first equation describes downstream running sonic waves of the form  $P' + \gamma \overline{M} V'$ , traveling at sonic speed plus through-flow velocity. The second equation describes upstream running sonic waves of the form  $P' - \gamma \overline{M} V'$ , traveling at sonic speed minus through-flow velocity. The third equation describes entropy waves,  $P' - \gamma \rho'$ , drifting downstream at through-flow velocity.

The entropy waves become more apparent from the expression for the entropy of an ideal gas:

$$\frac{\Delta S}{C_V} = S' = P' - \gamma \rho' \tag{8}$$

The entropy waves are related to temperature by:

$$\gamma \mathbf{T}' = \mathbf{S}' + (\gamma - 1) \mathbf{P}' \tag{9}$$

It is through equation (9) that the drifting hot and cold combustion products, or entropy waves, are accounted for in the rumble model. Temperature changes produced as the entropy waves strike the exhaust nozzle create waves which then travel back upstream at sonic speed.

Equations (7) are not useful until the integrals are evaluated, which will require definitions of  $\overline{V}(x)$ ,  $\overline{C}(X)$ ,  $\overline{q}(x)$ ,  $\overline{P}(x)$  and some assumptions that will allow integration of q'(x,s),  $\beta_{\overline{F}}(x,s)$ ,  $\beta_{\overline{G}}(x,s)$  and  $\beta_{\overline{E}}(x,s)$ . To complete the solution, the augmentor is divided into several "short" sections, each of length  $\ell$ , for each of which it can be assumed:

(a) 
$$\frac{d \bar{P}(x)}{dx} = 0$$

(b) 
$$\frac{d T(x)}{dx} = constant$$

(c) 
$$q'(\mathbf{x},t) = q'\left(0, t - \int_{0}^{\mathbf{x}} \frac{d\mathbf{x}}{\hat{\mathbf{V}}}\right)$$

(d) 
$$\frac{\bar{q}(x)}{\bar{P}(x)} = constant$$

The small static pressure drop in an augmentor justifies assumption (a). A linear temperature rise is also a good approximation, which justifies assumption (b). Assumption (c) is the equation for a "drifting burning particle" releasing heat at a constant volumetric rate as it drifts down the augmentor. A more detailed explanation of this assumption will be provided in part 2 (Development of Combustion Equations). To justify the constant steady-state heat release rate  $(\bar{q})$ , consider the steady-state version of the energy equation (third in equations (2)).

$$\bar{V} \left[ \frac{1}{\bar{P}} \frac{d\bar{P}}{dx} - \frac{\gamma}{\bar{\rho}} \frac{d\bar{\rho}}{dx} \right] = (\gamma - 1) \frac{\bar{q}}{\bar{P}}$$

With appropriate substitutions, the equation reduces to:

$$\frac{\tilde{q}}{\bar{P}} = \left( \frac{\gamma}{\gamma - 1} \right) \frac{R}{\bar{P}} \frac{\bar{W}}{A} \frac{dT}{dx} - \frac{\bar{V}}{\bar{P}} \frac{d\bar{P}}{dx}$$

Since 
$$\frac{d\bar{P}}{dx} = 0$$
 and  $\frac{d\bar{T}}{dx} = constant$ , then

$$\frac{\bar{\mathbf{q}}}{\bar{\mathbf{p}}} = \text{constant} = \frac{\gamma}{\gamma - 1} \frac{\bar{\mathbf{C}}_1 \bar{\mathbf{M}}_1}{\ell} \left( \frac{\bar{\mathbf{T}}_2}{\bar{\mathbf{T}}_1} - 1 \right)$$
 (10)

For a "short" section of length  $\ell$ , the integration of  $\beta_F$  (x,s) in equations (7) can be carried out as follows:

$$\int\limits_{a}^{b} \frac{\bar{q}}{\bar{P}} \; \beta_{F}'(x,S) \; \frac{d}{dx} \; e^{-s \int\limits_{a}^{b} \frac{dx}{V+C}} \; dx \approx \frac{\bar{q}}{\bar{P}} \; \beta_{F}'(o,S) \; \int\limits_{a}^{b/2} \frac{d}{dx} \; e^{-s \int\limits_{a}^{b} \frac{dx}{V+C}} \; .$$

$$+ \frac{\bar{\mathbf{q}}}{\bar{\mathbf{p}}} \beta_{\mathbf{r}}(\ell, \mathbf{S}) \int_{/2} \frac{\mathbf{d}}{\mathbf{d}\mathbf{x}} e^{\mathbf{s} \int_{0}^{\mathbf{x}} \frac{\mathbf{d}\mathbf{x}}{\bar{\mathbf{V}} + \mathbf{C}}} d\mathbf{x}$$

Similar treatment allows integration of  $\beta_G$  (x,s) and  $\beta_E$  (x,s) in equation (7). To determine how "short" a section must be for the solution to be valid, the resulting rumble model was exercised repeatedly while decreasing the section length (by adding more stations in the combustion zone). As the section length decreases, the result will rapidly approach an exact solution. It was found that section lengths shorter than about 20 inches were unnecessary.

With the above assumptions, equation (7) becomes:

$$\begin{split} & [P_{2}^{'} + \gamma \bar{M}_{2} V_{2}^{'} - [P_{1}^{'} + \gamma \bar{M}_{1} V_{1}^{'}] e^{-\tau_{F} S} - (\gamma - 1) \frac{\tilde{q}}{P} \ \beta_{F_{1}}^{'} \left[ - \frac{e^{-\tau_{F} S} - e^{-\tau_{F_{2}} S}}{S} \right] \\ & + (\gamma - 1) \frac{\tilde{q}}{P} \ \beta_{F_{2}}^{'} \left[ - \frac{1 - e^{-\tau_{F_{2}} S}}{S} \right] = (\gamma - 1) \frac{\tilde{q}}{P} \ q_{1}^{'} \left\{ - \bar{M}_{1} \left[ - \frac{e^{-\tau_{F} S} - e^{-(\tau_{E_{1}} + \tau_{F_{2}}) S}}{S} \right] \right. \\ & + \bar{M}_{2} \left[ - \frac{e^{-(\tau_{F_{2}} + \tau_{E_{1}}) S} - e^{-\tau_{E} S}}{S} \right] \right\} \\ & + \bar{M}_{2} \left[ - \frac{e^{-(\tau_{F_{2}} + \tau_{E_{1}}) S} - e^{-\tau_{E} S}}{S} \right] \\ & - (\gamma - 1) - \frac{\tilde{q}}{P} \ \beta_{G_{2}}^{'} \left[ - \frac{e^{-\tau_{G} S} - e^{-\tau_{G} S}}{S} \right] \\ & = (\gamma - 1) - \frac{\tilde{q}}{P} \ q_{1}^{'} \left\{ - \bar{M}_{1} - \left[ - \frac{1 - e^{-(\tau_{G_{1}} + \tau_{E_{1}}) S}}{S} \right] + \bar{M}_{2} - \left[ - \frac{e^{-(\tau_{G_{1}} + \tau_{E_{1}}) S} - e^{-(\tau_{G} + \tau_{E}) S}}{S} \right] \right. \\ & + (\gamma - 1) - \frac{\tilde{q}}{P} \ \beta_{E_{2}}^{'} \left[ - \frac{1 - e^{-\tau_{E} S}}{S} \right] = (\gamma - 1) - \frac{\tilde{q}}{P} \ \beta_{E_{1}}^{'} \left[ - \frac{e^{-\tau_{E} S} - e^{-\tau_{E} S}}{S} \right] \\ & + (\gamma - 1) - \frac{\tilde{q}}{P} \ \beta_{E_{2}}^{'} \left[ - \frac{1 - e^{-\tau_{E_{2}} S}}{S} \right] = (\gamma - 1) - \frac{\tilde{q}}{P} \ q_{1}^{'} \tau_{E}^{'} e^{-\tau_{E} S} \end{split}$$

where: 
$$\tau_{F} \equiv \int_{0}^{f} \frac{dx}{\hat{V} + \hat{C}} \qquad \tau_{G} \equiv -\int_{0}^{f} \frac{dx}{\hat{V} - \hat{C}} \qquad \tau_{E} \equiv \int_{0}^{f} \frac{dx}{\hat{V}}$$

$$\tau_{F_{1}} \equiv \int_{0}^{f} \frac{dx}{\hat{V} + \hat{C}} \qquad \tau_{G_{1}} \equiv -\int_{0}^{f} \frac{dx}{\hat{V} - \hat{C}} \qquad \tau_{E_{1}} \equiv \int_{0}^{f} \frac{dx}{\hat{V}}$$

$$\tau_{F_{2}} = \tau_{F} - \tau_{F_{1}} \qquad \tau_{E_{2}} = \tau_{E} - \tau_{E_{1}}$$

$$\beta_{F_{1}}^{r} \equiv \frac{1}{(1 - M_{1}^{2})} \left[ P_{1}^{r} (1 - M_{1} - M_{1}^{2}) + \rho_{1} \hat{M}_{1} + V_{1}^{r} \left\{ \frac{1}{2} + \frac{3}{2} \hat{M}_{1} - \hat{M}_{1}^{2} \left[ 1 + (1 + \hat{M}_{1}) \frac{\gamma}{2} \right] \right\} \right]$$

$$\beta_{F_{1}}^{r} \equiv \frac{1}{(1 - M_{1}^{2})} \left[ P_{1}^{r} (1 + \hat{M}_{1} - M_{1}^{2}) - \rho_{1} \hat{M}_{1} + V_{1}^{r} \left\{ \frac{1}{2} - \frac{3}{2} \hat{M}_{1} - \hat{M}_{1}^{2} \left[ 1 + (1 - \hat{M}_{1}) \frac{\gamma}{2} \right] \right\} \right]$$

$$\beta_{G_{1}}^{r} \equiv \frac{1}{(1 - \hat{M}_{2}^{2})} \left[ P_{2}^{r} (1 + \hat{M}_{2} - \hat{M}_{2}^{2}) - \rho_{2} \hat{M}_{2} + V_{2}^{r} \left\{ \frac{1}{2} - \frac{3}{2} \hat{M}_{1} - \hat{M}_{1}^{2} \left[ 1 + (1 - \hat{M}_{1}) \frac{\gamma}{2} \right] \right\} \right]$$

$$\beta_{E_{1}}^{r} \equiv P_{1}^{r} + V_{1}^{r}$$

$$\beta_{E_{2}}^{r} \equiv P_{2}^{r} + V_{2}^{r}$$

$$(13)$$

For convenience in programming equations (11) on the computer, the following identity substitutions were made:

$$\beta'_{F_{1}} = PF_{1} P'_{1} + RF_{1}\rho'_{1} + VF_{1}V_{1}'$$

$$\beta'_{F_{2}} = PF_{2} P'_{2} + RF_{2}\rho'_{2} + VF_{2}V_{2}'$$

$$\beta'_{G_{1}} = PG_{1} P'_{1} + RC_{1}\rho'_{1} + VG_{1}V_{1}'$$

$$\beta'_{G_{2}} = PG_{2} P'_{2} + RG_{2}\rho'_{2} + VG_{2}V_{2}'$$
(14)

where by definition:

$$\begin{split} & \text{PF}_1 = \frac{1}{(1-M_1^2)} \quad [1-\bar{M}_1 - \bar{M}_1^2] \\ & \text{RF}_1 = \frac{\bar{M}_1}{(1-\bar{M}_1^2)} \\ & \text{VF}_1 = \frac{1}{(1-\bar{M}_1^2)} \left\{ \frac{1}{2} + \frac{3}{2} \ \bar{M}_1 - \bar{M}_1^2 \left[ 1 + (1+\bar{M}_1) \ \frac{\gamma}{2} \right] \right\} \\ & \text{PF}_2 = \frac{1}{(1-\bar{M}_2^2)} \quad [1 - \bar{M}_2 - \bar{M}_2^2] \\ & \text{RF}_2 = \frac{\bar{M}_2}{(1-\bar{M}_2^2)} \\ & \text{VF}_2 = \frac{1}{(1-\bar{M}_2^2)} \left\{ \frac{1}{2} + \frac{3}{2} \ \bar{M}_2 - \bar{M}_2^2 \left[ 1 + (1+\bar{M}_2) \ \frac{\gamma}{2} \right] \right\} \\ & \text{PG}_1 = \frac{1}{(1-\bar{M}_1^2)} \quad [1-\bar{M}_1 - \bar{M}_1^2] \\ & \text{RG}_1 = \frac{-\bar{M}_1}{(1-\bar{M}_1^2)} \\ & \text{VG}_2 = \frac{1}{(1-\bar{M}_2^2)} \left\{ \frac{1}{2} - \frac{3}{2} \ \bar{M}_1 - \bar{M}_1^2 \left[ 1 + (1-\bar{M}_1) \ \frac{\gamma}{2} \right] \right\} \\ & \text{PG}_2 = \frac{1}{(1-\bar{M}_2^2)} \quad [1 + \bar{M}_2 - \bar{M}_2^2] \\ & \text{RG}_2 = \frac{-\bar{M}_2}{(1-\bar{M}_2^2)} \\ & \text{VG}_2 = \frac{1}{(1-\bar{M}_2^2)} \left\{ \frac{1}{2} - \frac{3}{2} \ \bar{M}_2 - \bar{M}_1^2 \left[ 1 + (1-\bar{M}_2) \ \frac{\gamma}{2} \right] \right\} \end{split}$$

The time constants in equations (12) were evaluated based upon the steady-state through-flow and sonic speed profiles created by the linear temperature gradient.

$$\nabla(\mathbf{x}) = \nabla_{1} \left[ 1 + \left( \frac{\mathbf{T}_{2}}{\mathbf{T}_{1}} - 1 \right) \frac{\mathbf{x}}{\ell} \right]$$

$$\mathbf{C}(\mathbf{x}) = \mathbf{C}_{1} \quad \sqrt{1 + \left( \frac{\mathbf{T}_{2} - \mathbf{T}_{1}}{\mathbf{T}_{1}} \right) \frac{\mathbf{x}}{\ell}}$$
(16)

Then the time constants in equations (12) become:

$$\tau_{E} \equiv \frac{\ell/C_{1}}{\left(\frac{T_{2}}{T_{1}} - 1\right)} \frac{2}{M_{1}} \ell_{B} \left[ \frac{1 + M_{1}\sqrt{T_{2}/\Gamma_{1}}}{1 + M_{1}} \right] 
\tau_{G} \equiv \frac{\ell/C_{1}}{\left(\frac{T_{2}}{T_{1}} - 1\right)} \frac{2}{M_{1}} \ell_{B} \left[ \frac{1 - M_{1}}{1 - M_{1}} \sqrt{T_{2}/\Gamma_{1}} \right] 
\tau_{E} \equiv \frac{\ell/C_{1}}{\left(\frac{T_{2}}{T_{1}} - 1\right)} \frac{1}{M_{1}} \ell_{B} \left[ \frac{T_{2}}{T_{1}} \right] 
\tau_{F_{1}} \equiv \frac{\ell/C_{1}}{\left(\frac{T_{2}}{T_{1}} - 1\right)} \frac{2}{M_{1}} \ell_{B} \left[ \frac{1 + M_{1}\sqrt{-\frac{1/2}{2}(1 + T_{2}/\Gamma_{1})}}{1 + M_{1}} \right] 
\tau_{G_{1}} \equiv \frac{\ell/C_{1}}{\left(\frac{T_{2}}{T_{1}} - 1\right)} \frac{2}{M_{1}} \ell_{B} \left[ \frac{1 - M_{1}}{1 - M_{1}\sqrt{-\frac{1/2}{2}(1 + T_{2}/\Gamma_{1})}} \right] 
\tau_{E_{1}} \equiv \frac{\ell/C_{1}}{\left(\frac{T_{2}}{T_{1}} - 1\right)} \frac{1}{M_{1}} \ell_{B} \left[ \frac{1 - M_{1}}{1 - M_{1}\sqrt{-\frac{1/2}{2}(1 + T_{2}/\Gamma_{1})}} \right]$$

This completes the development of the wave equations.

Equations (11) are applied throughout the augmentor between any two stations between which there is no discontinuity. In applying the equations, the general subscripts 1 and 2 are replaced by the actual upstream and downstream station numbers, respectively. Referring to Figure 21, they are applied between stations (1) - (2), (2) - (3), (4) - (5), (5) - (10) and (10) - (11). Between stations (1) through (5) and between stations (10) - (11) there is no heat addition, and so the heat addition terms  $\bar{q}/\bar{P}$  are set to zero. The heat addition terms for the combustion zone, stations (5) - (10), are discussed in paragraph 2 of this appendix.

Discontinuities occur at the pressure drop locations, stations (2) and (3). These are modeled as small incompressible resistive pressure drops of zero length. The continuity and energy equations are also applied. Referring to Figure 21, across a pressure drop:

$$P_{2} - P_{3} \approx \frac{\rho_{2} V_{2}^{2}}{2}$$

$$W_{2} = W_{3}$$

$$T_{2} = T_{3}$$
(18)

The equations are linearized and normalized as before to yield:

$$P_{2}' - \left[ 1 - \left( \frac{\bar{P}_{2} - \bar{P}_{3}}{\bar{P}_{2}} \right) \right] P_{3}' = \left( \frac{\bar{P}_{2} - \bar{P}_{3}}{\bar{P}_{2}} \right) (\rho_{2}' + 2V_{2}')$$

$$\rho_{2}' + V_{2}' = \rho_{3}' + V_{3}'$$

$$P_{2}' - \rho_{2}' = P_{3}' - \rho_{3}'$$
(19)

In applying equations (19) to a given pressure drop, the general subscripts 2 and 3 are replaced by the actual upstream and downstream station numbers, respectively. For convenience in programming, equations (19) were combined with the wave equations (11) to eliminate the need for two stations at each pressure drop. It is the combined equations which appear in the rumble model listing.

A junction occurs where the core stream and fan stream enter the augmentor and form the overall augmentor stream (stations (3), (3H) and (4)). Again applying continuity, momentum and energy:

$$W_3 + W_{3H} = W_4$$

$$\left( \begin{array}{c} P - P_{4} \\ \hline P \end{array} \right) \begin{array}{c} & \approx \left( \begin{array}{c} W \sqrt{T} \\ \hline P \end{array} \right)^{2} \\ & \text{FAN SIDE} \\ & \text{OR} \\ & \text{CORE SIDE} \end{array} \approx \left( \begin{array}{c} W \sqrt{T} \\ \hline P \end{array} \right)^{2}$$
 (20)

$$W_aT_a + W_{aH} T_{aH} = W_aT_a$$

 $W_{\text{3}}T_{\text{3}} + W_{\text{3H}} \; T_{\text{3H}} = W_{\text{4}}T_{\text{4}}$  The linearized and normalized versions become:

$$\begin{split} \rho_{4}^{\prime} + V_{4}^{\prime} &= \left( \begin{array}{c} \frac{BPR}{1+BPR} \right) \rho_{3}^{\prime} + \left( \begin{array}{c} \frac{BPR}{1+BPR} \right) V_{3}^{\prime} + \left( \begin{array}{c} \frac{1}{1+BPR} \right) \rho_{3H}^{\prime} + \left( \begin{array}{c} \frac{1}{1+BPR} \right) V_{3H}^{\prime} \\ \\ P_{3}^{\prime} - \left[ \begin{array}{c} 1 - \left( \begin{array}{c} \frac{P_{3} - P_{4}}{P_{3}} \right) \right] P_{4}^{\prime} = 2 \quad \left( \begin{array}{c} \frac{P_{3} - P_{4}}{P_{3}} \right) \left( \begin{array}{c} \frac{BPR}{1+BPR} \right) V_{3}^{\prime} \\ \\ + \left( \begin{array}{c} \frac{P_{3} - P_{4}}{P_{3}} \right) \left( \begin{array}{c} \frac{BPR}{1+BPR} \right) \rho_{3}^{\prime} + 2 \left( \begin{array}{c} \frac{P_{3} - P_{4}}{P_{3}} \right) \left( \begin{array}{c} \frac{1}{1+BPR} \right) V_{3H}^{\prime} \\ \\ + \left( \begin{array}{c} \frac{P_{3} - P_{4}}{P_{3}} \right) \left( \begin{array}{c} \frac{1}{1+BPR} \right) \rho_{3H}^{\prime} \\ \\ + \left( \begin{array}{c} \frac{P_{3} - P_{4}}{P_{3}} \right) \left( \begin{array}{c} \frac{BPR}{1+BPR} \right) \rho_{3}^{\prime} + 2 \left( \begin{array}{c} \frac{P_{3} - P_{4}}{P_{3}} \right) \left( \begin{array}{c} \frac{1}{1+BPR} \right) V_{3H}^{\prime} \\ \\ + \left( \begin{array}{c} \frac{P_{3} - P_{4}}{P_{3}} \right) \left( \begin{array}{c} \frac{1}{1+BPR} \right) \rho_{3H}^{\prime} \\ \\ \end{array} \right) \rho_{3H}^{\prime} \\ \\ V_{4}^{\prime} + P_{4}^{\prime} &= \left[ \begin{array}{c} \frac{BPR}{1+BPR} \left( T_{3} / T_{H} \right) \right] P_{3H}^{\prime} + \left[ \begin{array}{c} \frac{BPR}{1+BPR} \left( T_{3} / T_{H} \right) \right] \\ \\ = \left[ \begin{array}{c} \frac{1}{1+BPR} \left( T_{3} / T_{H} \right) \right] P_{3H}^{\prime} + \left[ \begin{array}{c} \frac{1}{1+BPR} \left( T_{3} / T_{H} \right) \right] \end{array} \right] \\ \end{array} \right) \\ \end{array}$$

For the Swirl augmentor, the momentum equations at stations (3) - (4) and (3H) - (4) are modified to account for the possibility of different pressure drops across the fan and core swirl vanes. The linearized version of the momentum equations for the Swirl augmentor becomes:

$$P_{3}' - \left[ 1 - \left( \frac{\bar{P}_{3} - \bar{P}_{4}}{\bar{P}_{3}} \right) \right] P_{4}' = 2 \left( \frac{\bar{P}_{3} - \bar{P}_{4}}{\bar{P}_{3}} \right) V_{3}' + \left( \frac{\bar{P}_{3} - \bar{P}_{4}}{\bar{P}_{3}} \right) \rho_{3}'$$

$$P_{3H}' - \left[ 1 - \left( \frac{\bar{P}_{3H}' - \bar{P}_{4}'}{\bar{P}_{3H}} \right) \right] P_{4}' = 2 \left( \frac{\bar{P}_{3H} - \bar{P}_{4}}{\bar{P}_{3H}} \right) V_{3H}' + \left( \frac{\bar{P}_{3H} - \bar{P}_{4}}{\bar{P}_{3H}} \right) \rho_{3H}'$$
(22)

Definition of the upstream and downstream boundary conditions, at the fan and at the nozzle, respectively, will complete the acoustic equations. The fan was assumed to be delivering a constant mass flowrate through the fan OD (defined as that portion of the fan between the fan splitter and fan tip) and through the fan ID (defined as that portion of the fan between the centerline and the fan splitter). It was also assumed that the temperature of the fan discharge flow could be taken as time invarient (also, because of the low Mach number at fan discharge, total and static temperatures can be used interchangeably). To account for the presence of a core engine, and explore any possible attendant interaction with fan duct acoustics, a simple first order lag representation of the core engine was incorporated into the rumble model. The core engine was represented as a compressor delivering constant corrected air flow (corrected to compressor face conditions) into a lumped volume. Flow out of the volume exited through a choked turbine to emerge at station (3H). The resulting transfer function for the core engine is:

$$\frac{\mathbf{W'}_{3H}}{\mathbf{P_{C'}}} = \frac{1}{1 + \tau_{\text{CORE}} \, \mathbf{S}} \tag{23}$$

Where:

 $W'_{3H}$  = mass flowrate at station (3H)

 $P'_{C}$  = static pressure at the compressor face

 $\tau_{\text{CORE}}$  = core engine time constant

A default value of  $\tau_{\rm CORE}$  = .005 seconds is built into the rumble model. A different value can be input by the user, and is calculated as the mass of air in the core engine volume divided by the mass flowrate of air through the core engine. Proximity of the fan splitter to fan discharge also affects the boundary condition at the fan. Two cases were considered and are built into the rumble model (see NFSOP). In the first case, called the "proximate" splitter configuration, the fan splitter is assumed to be so close to fan discharge that no communication can occur between the fan duct and the core engine across the fan splitter. For this case, the boundary condition at the fan becomes:

$$P'_{C} = W'_{3H} = 0 W'_{1} = \rho'_{1} + V'_{1} = 0 T'_{1} = P'_{1} - \rho'_{1} = 0$$
(24)

In the second case, called the "remote" splitter configuration, the fan splitter is assumed to be sufficiently remote from fan discharge to allow perfect communication between the fan duct and the core engine across the fan splitter. For this case, the boundary condition at the fan becomes:

$$P'_{C} = P_{1}'$$

$$W_{1}' = \rho_{1}' + V_{1}' = -\frac{P_{1}'}{BPR}$$

$$T_{1}' = P_{1}' - \rho_{1}' = 0$$

$$W'_{SH} = \frac{P_{1}'}{1 + \tau_{CORE} S}$$
(25)

This completes the definition of the upstream boundary condition. It is of interest to note that entropy waves are created by sonic wave reflections at the upstream boundary. Since an entropy perturbation is  $S_1' = P_1' - \gamma \rho_1'$ , and at the boundary  $\rho_1' = P_1'$ , then  $S_1' = (1 - \gamma) P_1'$ . A similar argument will show that entropy waves are also created at the pressure drops (stations (2) and (3)). These are automatically accounted for in the rumble model, but are of minor importance compared to the entropy waves created in the combustion zone by combustion disturbances.

The downstream boundary condition is based upon the presence of a "short" nozzle just downstream of station (11), for which:

$$\frac{W\sqrt{T_0R}}{AP_0} = \phi (P_R)$$
 (26)

where:

$$\phi = \frac{\left[\left(P_{R}^{\frac{\gamma-1}{\gamma}} - 1\right)\left(\frac{2}{\gamma-1}\right)\right]^{\kappa}}{P_{R}^{\frac{\gamma+1}{2\gamma}}}$$

 $P_R = P_o / \text{nozzle throat static pressure}$ 

$$P_{\scriptscriptstyle R} \leq \left( \frac{\gamma+1}{2} \; \right)^{\frac{\gamma}{\gamma-1}}$$

When linearized, the downstream boundary condition becomes:

$$V_{ii'} = \frac{1}{2} (P_{ii'} - \rho_{ii'}) + (KNOZ) P_{ii'}$$
 (27)

where:

$$KNOZ = \frac{\left[1 + \left(\frac{\gamma+1}{2}\right) \bar{M}_{11}\right] \left(\frac{P_R}{\phi} \frac{\partial \phi}{\partial P_R}\right)}{\left[1 - \bar{M}_{11}^2 (1+\gamma)\right] \left(\frac{P_R}{\phi} \frac{\partial \phi}{\partial P_R}\right)}$$

$$\frac{P_{R} \frac{\partial \phi}{\partial P_{R}}}{\phi \frac{\partial P_{R}}{\partial P_{R}}} = \left[ \frac{P_{R} \frac{\gamma - 1}{\gamma}}{2 \left(P_{R} \frac{\gamma - 1}{\gamma} - 1\right)} - \frac{\gamma + 1}{2 (\gamma - 1)} \right] \left(\frac{\gamma - 1}{\gamma}\right)$$

It is also of interest to note that for choked flow,

$$P_{_{\mathbf{R}}} \geq \left( \begin{array}{c} \frac{\gamma+1}{2} \end{array} \right)^{\frac{\gamma}{\gamma-1}},$$

then KNOZ = 0 and:

$$V_{ii}' = \frac{1}{2} (P_{ii}' - \rho_{ii}') = \frac{1}{2} T_{ii}'$$
 (28)

substituting from equation (16):

$$V_{ii}' = \frac{1}{2\gamma} S_{ii}' + \frac{(\gamma - 1)}{2\gamma} P_{ii}'$$
 (29)

This equation directly relates how entropy waves, as well as pressure disturbances, striking a choked nozzle will produce a velocity disturbance.

This completes the acoustic equation development. These equations describe the response of pressure, velocity and density throughout the augmentor to a disturbance in combustion. Development of the corresponding combustion equations, which describe how combustion throughout the augmentor will respond to disturbances in pressure, velocity and density, is presented in the following section.

#### 2. DEVELOPMENT OF COMBUSTION EQUATIONS

Development of the combustion equations for the V-gutter flameholder augmentor is presented first. Then the combustion equations for Vorbix and Swirl augmentors are presented.

For the V-gutter flameholder augmentor two combustion streams, the fan stream and the core stream, are treated. This is necessary to be able to account for the different combustion characteristics of the fan and core streams. The two streams can have different flameholder designs and fuel-air ratios as well as different flameholder approach temperatures and velocities, causing the two streams to have different efficiency vs. fuel-air ratio characteristics. In addition, the fan stream is preceded by a long fan duct which can exhibit longitudinal resonance at the low frequencies associated with rumble. The core stream is preceded by a short section terminating at turbine discharge, which is much less responsive at low frequencies.

The basic approach taken for the rumble model was to model combustion disturbances in the fan and core streams independently, accounting for the individual properties of each stream. The resulting two combustion disturbances (calculated as volumetric heat release rate disturbances) were then simply added to form a single overall disturbance. The overall disturbance was then distributed evenly over the total cross-sectional area of the augmentor, which was taken to consist of a single overall stream with mean mixed properties. This approach accounts for the different combustion characteristics of the fan and core streams, while avoiding the complexities associated with a rigorous treatment of the radial as well as the axial distribution of combustion throughout the augmentor.

Experience with modeling the combustion process as a plane heat addition with all combustion taking place in zero length, had shown that the resulting predictions of rumble were sensitive to the axial location chosen for the plane. Since combustion actually takes place over a distance of 30 to 60 inches, it was decided that the axially distributed nature of the burning should be accounted for. This was accomplished by dividing the combustion zone into a number of axial sections, each of length  $\ell$ , as explained in part 1, "Development of Acoustic Equations".

Combustion equations used in the rumble model are based upon an extension of empirical steady-state processes to the case of time variant flow. A schematic of the steady-state processes is shown in Figure 22. Consider first that the augmentor contains only the fan stream. An identical set of equations will exist for the parallel core stream. Following a particle of air as it moves through the augmentor, the following steps will occur:

- Particle of air picks up fuel as it crosses the spraybar.
- Particle drifts at through-flow velocity to the flameholder, station (4).
- Particle is ignited by the flameholder wake as it drifts from the flameholder, to the beginning of the combustion zone, station (5) (defined as the location where the bulk fluid temperature begins to rise sharply).
- Particle drifts and burns from station (5) to the end of the combustion zone, station (10) (defined as the location where bulk fluid temperature ceases its sharp rise).

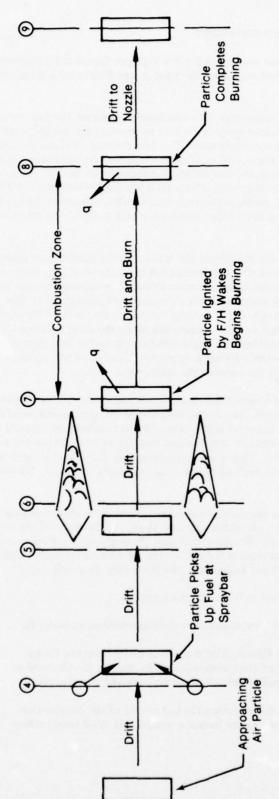


Figure 22. Steps in Augmentor Combustion Process

It was determined (see equation (10)) that for a linear temperature gradient, the steady-state volumetric heat release rate in the augmentor could be taken as independent of axial position. This implies that at steady-state a particle of fuel-air mixture, drifting and burning through the combustion zone, has a volumetric heat release rate that is independent of axial position. The rate can be computed directly from the flowrate, ideal temperature rise, efficiency and combustion zone volume of the augmentor.

$$q = \frac{C_p}{v} W T_i \eta \tag{30}$$

For small perturbations, it was assumed that transiently the volumetric heat release rate of a particle could still be taken as independent of axial position, and that equation (30) could be used to compute the rate when W,  $T_i$  and  $\eta$  are referenced to instantaneous approach conditions. The resulting equation will model combustion as though it behaves in a quasi-steady manner. The volumetric heat release rate at any location in the combustion zone will reach the steady-state value corresponding to instantaneous conditions at the flameholder and at the spraybar after a delay. The delay is the time required to purge the old combustion gases and refill with new combustion gases traveling at through-flow velocity.

For the fan stream, instantaneous approach conditions are taken to be the instantaneous conditions at station (3). Because of the large pressure drop in the fuel spraybar injector, changes in fuel flow in response to augmentor pressure at the spraybar are small compared to changes in air flow. Consequently, fuel flow can be considered constant, and the fuel-air ratio of the particle as it crosses the spraybar is determined by changes in air flow only.

$$FA_{S/B} = \frac{constant}{W_3}$$
 (31)

A period of time  $\tau_{DC}$  = LSC/ $\overline{V}_3$  is required for the particle to drift from the spraybar to the flameholder. Therefore, the fuel-air ratio of the particle when it reaches the flameholder can be expressed as:

$$FA_{c}(t) = FA_{S/B}(t - \tau_{DC})$$
(32)

At the ignition plane (flameholder) the particle has a "potential" volumetric heat release rate of:

$$q_c = \frac{C_p}{v_c} W_8 T_{tc} \eta_c$$
 (33)

The ideal temperature rise is a function of the fuel-air ratio of the particle (effects of approach temperature and pressure are negligible). The efficiency is assumed to be a function of the fuel-air ratio and the approach pressure, temperature and velocity.

$$T_{tc} = fcn(FA_c)$$
 (34)

$$\eta_{c} = Vfcn(FA_{c}, P_{s}, T_{s}, V_{s})$$
(35)

The total volumetric heat release rate (subscript "T") is formed by adding the heat release rates of the fan and core streams:

$$q_t v_T = Q_t = Q_C + Q_H = q_C v_C + q_H v_H$$
(41)

or, in normalized form:

$$\mathbf{q}_{t}' = \left[ \frac{\mathbf{Q}_{c}}{\mathbf{Q}_{t}} \right] \mathbf{q}_{c}' + \left[ \frac{\mathbf{Q}_{H}}{\mathbf{Q}_{t}} \right] \mathbf{q}_{H}' \tag{42}$$

Equation (42) computes the instantaneous volumetric heat release rate of a particle of combined fan stream and core stream fuel-air ratio mixture when the particle reaches the flameholder. The term "potential" is applied because the particle has not yet been ignited. The particle is ignited by the flameholder wake as it drifts a distance  $\ell_4$  at velocity  $\overline{V}_4$ . The particle begins releasing the "potential" heat at station (5), as defined by equation (36). To account for adding the core stream to the augmentor flow (originally only the fan stream was considered), equation (36) was rewritten to include the heat release of both the core and fan streams and emerges as:

$$\mathbf{q}(\mathbf{o},\mathbf{t}) = \mathbf{q}_{\mathbf{t}} \left( \mathbf{t} - \mathbf{q}_{\mathbf{4}} / \nabla_{\mathbf{4}} \right) \tag{43}$$

Linearized:

$$\mathbf{q}'(\mathbf{0},\mathbf{t}) = \mathbf{q}'_{\mathbf{t}} \left(\mathbf{t} - \ell_{\mathbf{4}} / \bar{\mathbf{V}}_{\mathbf{4}}\right) \tag{44}$$

Equation (44) simply adds a delay into the system which allows tailoring the axial location of the beginning of the combustion zone. For convenience in programming the equations, this delay is added to the drift delay in the combustion zone ( $\tau_{\rm E}$ ) to form an overall particle drift delay from the flameholder.

$$\tau_{\mathbf{Q}} = \ell_{\mathbf{4}} / \bar{\mathbf{V}}_{\mathbf{4}} + \tau_{\mathbf{E}} \tag{45}$$

The particle then releases heat throughout the combustion zone as defined by equation (37), the linearized version of which is:

$$q'(\mathbf{x},t) = q'(0, t - \tau_{\mathbf{E}}) \tag{46}$$

Equation (45) was presented in part 1, "Development of Acoustic Equations", and used to evaluate integrals in equation (7). The combustion equations require that the following information about the steady-state operating point:

$$\begin{bmatrix} \frac{Q_{c}}{Q_{t}} \end{bmatrix}, \begin{bmatrix} \frac{Q_{H}}{Q_{t}} \end{bmatrix}, \begin{bmatrix} \frac{FA}{T_{1}} \frac{\partial T_{1}}{\partial FA} \end{bmatrix}_{C,H}, \begin{bmatrix} \frac{FA}{\eta} \frac{\partial \eta}{\partial FA} \end{bmatrix}_{C,H},$$

$$\begin{bmatrix} \frac{P}{\eta} \frac{\partial \eta}{\partial P} \end{bmatrix}_{C,H}, \begin{bmatrix} \frac{T}{\eta} \frac{\partial \eta}{\partial T} \end{bmatrix}_{C,H}, \text{ and } \begin{bmatrix} \frac{V}{\eta} \frac{\partial \eta}{\partial V} \end{bmatrix}_{C,H},$$

The heat release rate ratios  ${\rm Q_C/Q_T}$  and  ${\rm Q_H/Q_T}$  are computed in the program from conditions known about each augmentor stream:

$$\frac{\mathbf{Q_c}}{\mathbf{Q_t}} = \frac{(\mathrm{BPR} \ \mathbf{T_{ic}} \ \eta_{\mathrm{C}})}{(\mathrm{BPR} \ \mathbf{T_{ic}} \ \eta_{\mathrm{C}}) + (\mathbf{T_{iH}} \ \eta_{\mathrm{H}})}$$

$$\frac{\mathbf{Q_H}}{\mathbf{Q_t}} = \frac{(\mathbf{Ti_H} \ \eta_{\mathrm{H}})}{(\mathrm{BPR} \ \mathbf{T_{ic}} \ \eta_{\mathrm{C}}) + (\mathbf{T_{iH}} \ \eta_{\mathrm{H}})}$$
(47)

The partial derivative terms  $\left[\begin{array}{cc} FA \\ T_i \end{array} \right. \left. \begin{array}{cc} \frac{\partial T_i}{\partial FA} \end{array} \right]_{C,\; H}$  are computed in the program from a

subroutine curvefit of the ideal temperature rise curve. A graphical definition of the term is supplied in Figure 23. The partial derivative terms involving efficiency are computed in the flameholder combustion model and supplied directly to the rumble model. Alternately, they may be computed from empirical data and be input by the user. The graphical definition of terms is similar to that of Figure 23.

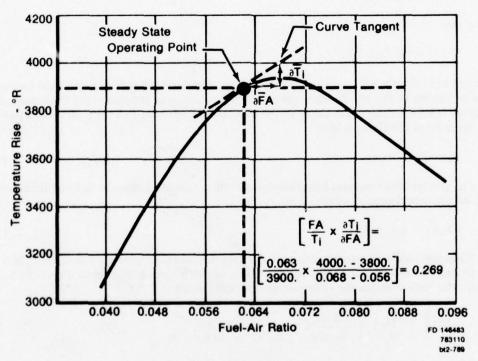


Figure 23. Ideal Temperature Rise for Constant Pressure Combustion of Hydrocarbon Fuels

This completes the combustion equation development for the V-gutter flameholder model. All of the above equations apply to the Vorbix and Swirl augmentors except as noted below.

For the Vorbix and Swirl augmentors, independent heat release rates for the fan and core streams cannot be identified because of the flow mixing. In addition, the effects of pilot fuel-air ratio on augmentor combustion efficiency must be accounted for. Equation (3) is again applied, but on an overall basis only.

$$q_t = \frac{Cp}{v} W_4 T_1 \eta \tag{48}$$

The overall fuel-air ratio is computed from total mixed air flow at station (4).

$$FA = \frac{\text{constant}}{W_{\bullet}} \tag{49}$$

The overall ideal temperature rise is a function of overall fuel-air ratio. The efficiency is assumed to be a function of overall fuel-air ratio, pilot fuel-air ratio and pressure at station (4).

$$T_1 = fch(FA)$$

$$\eta = fch(FA,FAP,P_4)$$
(50)

Then for the Vorbix and Swirl augmentors, the instantaneous "potential" volumetric heat release rate of a particle of mixture when the particle reaches station (4) is:

$$\mathbf{q}_{i}' = \left[ 1 - \left[ \frac{\mathbf{F}\mathbf{A}}{\mathbf{T}_{i}} \frac{\partial \mathbf{T}_{i}}{\partial \mathbf{F}\mathbf{A}} \right] - \left[ \frac{\mathbf{F}\mathbf{A}}{\eta} \frac{\partial \eta}{\partial \mathbf{F}\mathbf{A}} \right] \right] \mathbf{W}_{i}'$$

$$+ \left[ \frac{\mathbf{F}\mathbf{A}\mathbf{P}}{\eta} \frac{\partial \eta}{\partial \mathbf{F}\mathbf{A}\mathbf{P}} \right] \mathbf{F}\mathbf{A}\mathbf{P}' + \left[ \frac{\mathbf{P}}{\eta} \frac{\partial \eta}{\partial \mathbf{P}} \right] \mathbf{P}_{i}'$$
(52)

Equation (52) applies to both the Vorbix and Swirl augmentors, and is equivalent to equation (42) for the V-gutter augmentor. The Vorbix and Swirl augmentors differ in pilot location. The Swirl has the pilot at fan duct exit, so that air flow through the Swirl pilot is proportional to fan duct exit flow,  $W_3$ . The Vorbix has the pilot near midspan, radially, and slightly aft of stations (3) and (3H), so that air flow through the Vorbix pilot is proportional to total flow,  $W_4$ . Then, since fuel flow into both pilots is constant:

Swirl: 
$$FAP' = -W_3'$$
  
Vorbix:  $FAP' = -W_4'$  (53)

For convenience in programming,  $W_4$  can be replaced by:

$$W_{4} = W_{3} + W_{3H}$$

$$W_{4'} = \left[\frac{BPR}{1 + BPR}\right] W_{3'} + \left[\frac{1}{1 + BPR}\right] W_{3H}$$
(54)

Substituting (53) and (54) into (52):

Swirl: 
$$\mathbf{q}_{t}' = \left\{ \left( 1 - \left[ \frac{\mathbf{FA}}{\mathbf{T}_{1}} \frac{\partial \mathbf{T}_{1}}{\partial \mathbf{FA}} \right] - \left[ \frac{\mathbf{FA}}{\eta} \frac{\partial \eta}{\partial \mathbf{FA}} \right] \right) \left( \frac{\mathbf{BPR}}{1 + \mathbf{BPR}} \right) - \left( \frac{\mathbf{FAP}}{\eta} \frac{\partial \eta}{\partial \mathbf{FAP}} \right) \right\} \mathbf{W}_{sh}'$$

$$+ \left\{ \left( 1 - \left[ \frac{\mathbf{FA}}{\mathbf{T}_{1}} \frac{\partial \mathbf{T}_{1}}{\partial \mathbf{FA}} \right] - \left[ \frac{\mathbf{FA}}{\eta} \frac{\partial \eta}{\partial \mathbf{FA}} \right] \right) \left( \frac{1}{1 + \mathbf{BPR}} \right) \right\} \mathbf{W}_{sh}'$$

$$+ \left[ \frac{\mathbf{P}}{\eta} \frac{\partial \eta}{\partial \mathbf{P}} \right] \mathbf{P}_{sh}'$$

$$Vorbix: \mathbf{q}_{t}' = \left\{ \left( 1 - \left[ \frac{\mathbf{FA}}{\mathbf{T}_{1}} \frac{\partial \mathbf{T}_{1}}{\partial \mathbf{FA}} \right] - \left[ \frac{\mathbf{FA}}{\eta} \frac{\partial \eta}{\partial \mathbf{FA}} \right] - \left[ \frac{\mathbf{FAP}}{\eta} \frac{\partial \eta}{\partial \mathbf{FAP}} \right] \right) \left( \frac{\mathbf{BPR}}{1 + \mathbf{BPR}} \right) \right\} \mathbf{W}_{sh}'$$

$$+ \left\{ \left( 1 - \left[ \frac{\mathbf{FA}}{\mathbf{T}_{1}} \frac{\partial \mathbf{T}_{1}}{\partial \mathbf{FA}} \right] - \left[ \frac{\mathbf{FA}}{\eta} \frac{\partial \eta}{\partial \mathbf{FA}} \right] - \left[ \frac{\mathbf{FAP}}{\eta} \frac{\partial \eta}{\partial \mathbf{FAP}} \right] \right) \left( \frac{1}{1 + \mathbf{BPR}} \right) \right\} \mathbf{W}_{sh}'$$

$$+ \left[ \frac{\mathbf{P}}{\eta} \frac{\partial \eta}{\partial \mathbf{P}} \right] \mathbf{P}_{sh}'$$

$$(56)$$

Equations (55) and (56) replace equation (42). All other combustion equations are identical to those developed for the V-gutter flameholder augmentor. The partial derivatives in equations (55) and (56) must be computed from empirical data and be input by the user.

This completes development of the combustion equations. For the solution technique, based upon applying the Nyquist criterion to the open loop transfer function (OLTF), the OLTF is formed by renaming  $q_T$  to  $q_{IN}$  in equation (44) and by renaming  $q_T$  to  $q_{OUT}$  in equations (42), (55) and (56).

## APPENDIX B

### DEVELOPMENT OF FLAMEHOLDER COMBUSTION MODEL EQUATIONS

## 1. DEVELOPMENT OF THE FAN DUCT COMBUSTION EQUATIONS

The equations which are used in the fan duct combustion analysis are highlighted in this section. The reader is referred to the AFAPL TR-78-24 (Contract F33615-76-C-2023) for full details of the analytical development.

The program utilizes the input to set-up and analyze each streamtube as a separate entity. The results are stored for final summation at the completion of the fan duct analysis.

The flow field is first developed from the input:

$$\rho_{\rm a} = \frac{\rm P_s}{\rm RT_a} \tag{57}$$

$$V_{a} = M \sqrt{\gamma R T_{a}}$$
 (58)

$$W = N/\Gamma \tag{59}$$

$$\mathbf{m_a} = \rho_{\mathbf{a}} \mathbf{V_a} \mathbf{W} \tag{60}$$

The streamtube width has been set from the flameholder width and the blockage ratio. Note that the streamtube is assumed to be 1-in. deep. The total flowrates are thus per unit depth. If true total flowrates are desired, the number of streamtubes of each type must be set to reflect the total true depth of that type. For example, if 5 streamtubes, of 4 inches depth each, are input as one type, then set the input number of this type equal to 20.

To account for the removal of air from the streamtube for liner cooling, the input fuelair ratio is adjusted by:

$$FA \Big)_{\text{effective}} = FA \Big)_{\text{input}} \frac{1}{1 - \text{WCOOL}\left(\frac{1 + \text{BPR}}{\text{BPR}}\right)}$$
(61)

This increases the fuel-air ratio to reflect the air removal when:

$$WCOOL = \dot{m}_{cooling} / \dot{m}_{engine}$$
 (62)

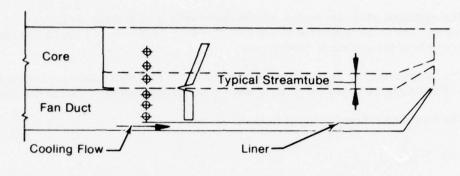
$$BPR = \dot{m}_{duct} / \dot{m}_{core}$$
 (63)

$$\dot{\mathbf{m}}_{\text{engine}} = \dot{\mathbf{m}}_{\text{duct}} + \dot{\mathbf{m}}_{\text{core}}$$
 (64)

Then

$$\dot{m}_{\rm f} = \dot{m}_{\rm a} \, ({\rm FA})_{\rm effective}$$
 (65)

This is required since fuel-air ratios are usually based on the total fan duct air flowrates. If true values are known or if no cooling air is used, set WCOOL = 0.0. Refer to Figure 24 for details.



 $BPR = W_{Duct}/W_{Core}$ ;  $WCOOL = W_{Cooling}/W_{Total}$ 

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Figure 24. Location of a Core Streamtube in a Turbofan Engine Augmentor

The injection subroutine divides the fuel into 5 droplet size groups which represent the droplet size vs. volume distribution. The curve used is for a variable area pintle injection. The sizes used are:

Group	% Covered	Mean Value
1	0-20	$d_{10}$
2	20-40	$d_{30}$
3	40-60	$d_{50}$
4	60-80	$d_{70}$
5	80-100	$d_{90}$

The curve is a function of the injection pressure drop where:

$$\Delta P_{inj} = PFSR - Ps \tag{66}$$

Any flash vaporization is evaluated from the fuel enthalpy chart assuming adiabatic injection, i.e.,  $\Delta H = 0$ 

$$H_1 = fcn (PFSR, TFSR)$$
 (67)

$$H_2 = fcn (\% vaporized, Ps)$$
 (68)

The droplet vaporization and acceleration are evaluated by a small time step integration between the sprayring and flameholder. The equations are:

$$\frac{\mathrm{d}V_t}{\mathrm{d}t} = \frac{3}{4} \frac{\mathrm{C_d}}{\mathrm{d}_t} \frac{\rho_a}{\rho_t} (\mathrm{V_a} - \mathrm{V_t})^2 \tag{69}$$

for acceleration, and:

$$\dot{\mathbf{m}}_{\text{vaporized}} = \mathbf{K} \mathbf{A_s} \, \mathbf{P_s} \, \ell \mathbf{n} \, \left( \frac{\mathbf{P_s}}{\mathbf{P_s} - \mathbf{P_v}} \right)$$
 (70)

$$K = \frac{N_u D_v MW}{R d_t T_a}$$
 (71)

$$N_{\rm u} = 2 + 0.6 R_{\rm c}^{1/2} P_{\rm r}^{1/3}$$
 (72)

for vaporization.

The evaluation of the liquid temperature follows:

$$h_{t} = kN_{u}/d_{t} \tag{73}$$

$$\dot{\mathbf{q}} = \mathbf{h_f} \ \mathbf{A_s} \left( \mathbf{T_a} - \mathbf{T_l} \right) \beta \tag{74}$$

$$\beta = \frac{\mathbf{z}}{\mathbf{e}^{\mathbf{z}} - 1} \tag{75}$$

$$z = Cp_v \dot{m}_v / \pi k d_t N_u$$
 (76)

$$\Delta \dot{\mathbf{q}} = \dot{\mathbf{q}} - \dot{\mathbf{m}}_{\mathbf{v}} \,\lambda \tag{77}$$

$$\frac{dT_{\ell}}{dt} = \frac{\Delta \dot{q}}{m_{\ell} Cp_{\ell}} \tag{78}$$

$$\mathbf{m}_{\ell} = \rho_{\ell} \frac{4}{3} \pi \left( \frac{\mathbf{d}_{\ell}}{2} \right)^{s} \tag{79}$$

$$R_{e} = \frac{\rho_{a} d_{l} (V_{a} - V_{l})}{\mu_{g}}$$
(80)

This procedure is done for each size group until the flameholder is reached and the net fraction vaporized is evaluated.

$$\beta_1 = 1 - \left( \frac{\dot{\mathbf{m}}_{\mathbf{v}}}{\dot{\mathbf{m}}_{\mathbf{f}}} \right)_{\mathbf{at} \ \mathbf{F}/\mathbf{H}} \tag{81}$$

The impingement of liquid fuel into the flameholder is evaluated by use of a term  $\beta_2$  where:

$$\beta_2 = \frac{\dot{m}_{fc}}{\dot{m}_{f,f} \cdot \Gamma} \tag{82}$$

This evaluates the percentage of the liquid fuel exposed to the flameholder which actually collects into its surface. The evaluation procedure is done for each size droplet group by a correlation of  $\beta_2$  vs. flameholder size, apex angle, flow velocity and droplet diameter. The correlation is based on evaluations performed by droplet trajectory analysis using the potential flow field aerodynamics. The total impingement flowrate is thus:

$$\beta_2 = \frac{1}{\dot{m}} \sum_{i=1}^{\delta} \dot{m}(i) \ \beta_2(i)$$
 (83)

or:

$$\dot{\mathbf{m}}_{f_c} = \beta_2 \left( 1 - \beta_1 \right) \Gamma \dot{\mathbf{m}}_{f} \tag{84}$$

The liquid film vaporization rate is evaluated from the equations for the surface film vaporization caused by heat transfer from the flameholder wake. The surface is broken into ten elements and the vaporization and liquid temperature rise in each is calculated from:

$$\dot{\mathbf{m}}_{\mathbf{v}} = \mathbf{C}_{1} \, \mathbf{A}_{\mathbf{s}} \, \mathbf{P}_{\mathbf{s}} \, \ell \mathbf{n} \quad \left( \frac{\mathbf{P}_{\mathbf{s}}}{\mathbf{P}_{\mathbf{s}} - \mathbf{P}_{\mathbf{v}}} \right) \tag{85}$$

$$C_1 = \frac{N_u D_v MW}{R \Delta x T_a}$$
 (86)

$$N_{\rm u} = 0.33 \; R_{\rm e}^{0.8} \; P_{\rm r}^{0.83} \tag{87}$$

$$P_{v} = fcn (T_{i})$$
(88)

$$\dot{\mathbf{q}} = \dot{\mathbf{m}}_{f_c} C_p \Delta T_\ell + \lambda \left( \frac{N_u D_v MW}{R \Delta x T_a} \right) P_s A_s l_n \left( \frac{P_s}{P_s - P_v} \right)$$
(89)

$$\dot{\mathbf{q}} = \mathbf{h}_{\mathbf{f}} \, \mathbf{A}_{\mathbf{s}} \, (\mathbf{T}_{\mathbf{w}} - \mathbf{T}_{\mathbf{F}/\mathbf{H}}) \tag{90}$$

$$h_{f} = N_{u_{\mathbf{w}}} \frac{k}{N} \tag{91}$$

$$N_{u_{\mathbf{w}}} = 0.99 R_{e}^{0.5} P_{r}^{0.38}$$
(92)

The solution procedure for  $\beta_3$  breaks the flameholder surface into 10 equally spaced increments. The length of each is:

$$\Delta_{\mathbf{x}} = \frac{1}{10} \frac{N/2}{\sin \left(\alpha/2\right)} \tag{93}$$

The fuel collected by the surface is equally divided into the 10 elements on each face of the flameholder:

$$\dot{m}_{c}(i) = \frac{1}{20} \beta_{2} (1 - \beta_{1}) \Gamma \dot{m}_{f}$$
 (94)

Equations 29 to 36 are used for element i=1 on the surface with  $m_{f_c} = m_c$  (i) and the fuel temperature is assumed to be the same as the droplet liquid temperature at the flameholder. The fraction vaporized is calculated and the liquid temperature use evaluated. The procedure is repeated using fuel properties evaluated at:

$$\hat{T}_{\ell}(i) = T_{\ell}(i)_{o} + \frac{1}{2} \Delta T_{\ell}(i)$$
(95)

This procedure continues until convergence, i.e.,  $\Delta T_{\ell}$  varies less than 1% between passes. Into the next element, i = 2, the flowrate is set equal to the unvaporized portion of the i = 1 flow and the collection fraction per equation (94).

$$\dot{m}(2) = \dot{m}_c(2) + \dot{m}_c(1) - \dot{m}_v(1)$$
 (96)

This flowrate initial temperature is set equal to the mass average of the exit temperature from i = 1 and the droplet liquid collection temperature:

$$T_{\ell_1}(2) = \frac{\dot{m}_c(2) T_{\ell_c} + [\dot{m}_c(1) - \dot{m}_v(1)] T_{\ell_f}(1)}{\dot{m}_c(2) + \dot{m}_c(1) - \dot{m}_v(1)}$$
(97)

The solution procedure is separated until all 10 segments are finished. The vaporized flowrate is the sum of all 10 in both sides of the flameholder:

$$\dot{m}_{v} = 2 \times \sum_{i=1}^{10} \dot{m}_{v}(i)$$
 (98)

The fractive vaporized,  $\beta_3$ , is:

$$\beta_3 = \frac{\dot{m}_v}{\dot{m}_c} = \frac{\dot{m}_v}{(1 - \beta_1) \Gamma \beta_2 \dot{m}_f}$$
 (99)

All of the vaporized fuel is assumed to enter the recirculation zone.

From these equations,  $\beta_3$  is a function of the wake temperature. The temperature is a function of the wake fuel-air ratio and recirculation rate. Since  $\beta_3$  strongly influences the wake fuel-air ratio, the solution for wake composition and efficiency becomes a curve intersection procedure.

First we define the recirculation and wake kinetics equations and then the solution procedure.

#### a. Recirculation

The wake recirculation flowrate coefficient is defined as:

$$K_1 = m_r / \Gamma m_a \tag{100}$$

$$\dot{m}_r = \rho_a \, V_a \, N \, K_1 \tag{101}$$

For mass transfer across the recirculation zone boundaries and a homogeneous wake:

$$\dot{m}_r = \frac{\rho_a V_o}{\tau} \tag{102}$$

The wake volume is evaluated as a function of blockage, apex angle, and flow Mach number from literature references as shown in the flameholder Final Report, AFAPL TR-78-24. From this:

$$V_0 = C_v (L/D)(B/D)N^2$$
 (103)

We set:

$$\tau' = \frac{\tau V_a}{N} \tag{104}$$

$$\dot{m}_{r} = \frac{V_{a}}{N} \frac{\rho_{a} V_{o}}{\tau'} \tag{105}$$

Thus:

$$\dot{m}_{\rm r} = \frac{\rho_{\rm a} V_{\rm a} C_{\rm v} (L/D) (B/D) N}{\tau'}$$

and

$$K_1 = C_v(L/D)(B/D)(\tau')^{-1}$$
 (106)

By curve fits of L/D, B/D and  $\tau$  'vs.  $\alpha$ , N, Va, and Ta, we find the recirculation rate  $K_1$ .

## b. Wake Reaction Kinetics

The wake reaction is assumed to be a single step, second order reactive controlled as follows:

$$- \frac{dm}{dt} = \frac{k}{R^n} \chi_0^a \chi_1^{n-a} \frac{e^{-C/T}}{T^{n-0.6}}$$
 (107)

For a well stirred reactor (wake is assumed to behave as one):

$$\frac{A}{V_{o}P^{n}} = \frac{k(m+1)}{R^{n}y\varepsilon} \chi_{o}^{a} \chi_{f}^{n-a} \frac{e^{-C/T}}{T^{n-0.5}}$$
 (108)

For the assumed single-step reaction process postulated here, the reaction mass balance is (for propane fuel):

$$\phi C_3 H_8 + 50_2 + 5 m N_2 \rightarrow 3 y \epsilon C O_2 + 4 y \epsilon H_2 O + 
(\phi - y \epsilon) C_3 H_8 + 5 (1 - y \epsilon) O_2 + 5 m N_2$$
(109)

Also, a linear efficiency vs. temperature function is assumed:

$$T = T_a + \epsilon \Delta T_{\text{ideal}} \tag{110}$$

From these equations, the stirred reactor loading capability may be written as:

$$\frac{A}{V_o P^n} = \frac{k(m+1)[5(1-y\epsilon)]^a [\phi - y\epsilon]^{n-a} e^{-C/(T_1 + \epsilon \Delta T)}}{R^n y\epsilon [5(m+1) + \phi + y\epsilon]^n [T_1 + \epsilon \Delta T]^{n-0.6}}$$
(111)

Based on comparison of predicted results with available stirred reactor data, we use the following values for this reaction:

n: for 
$$\phi < 1$$
, n =  $2\phi$   
for  $\phi > 1$ , n =  $2/\phi$ 

a: a = n/2
C: C = E/R, see Figure 25

This yields:

$$\frac{A}{V_{o}P^{2\phi}} = \frac{1.29 \times 10^{10} (m+1)[5(1-y\epsilon)]^{\phi} (\phi-y\epsilon)^{\phi} e^{-C/(T_{1} + \epsilon \Delta T)}}{(0.08206)^{2\phi} y\epsilon[5(m+1) + \phi + y\epsilon]^{2\phi} [T_{1} + \epsilon \Delta T]}$$
(112)

for lean mixtures.

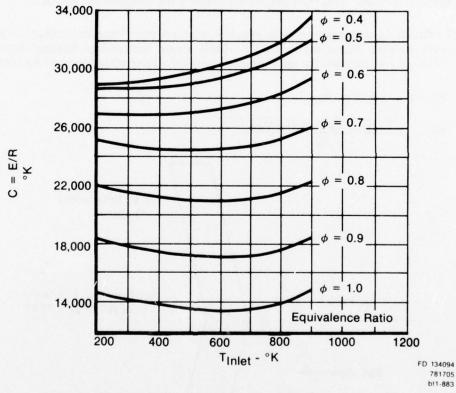


Figure 25. Variation in Activation Energy With Inlet Temperature and Equivalence Ratio

The kinetics solution proceeds by successive iteration between  $\epsilon$  = .999 and 0.70 to find the wake efficiency where:

$$\frac{A}{V_o P^2} = \frac{K_1 \Gamma \dot{m}_e}{V_o P_e^2} \tag{113}$$

at a given fuel-air ratio in the wake.

The solution procedure for the wake composition and reaction efficiency proceeds as follows:

- (1) The wake temperature is varied in steps from 1000° F to 5000° F and calculated at each wake.
- (2) The wake fuel-air ratio is varied from 0.02 to 0.20 and the wake temperature calculated at each fuel-air ratio.

The results of (1) are used in the wake fuel-air ratio equation:

$$[FA]_{\text{wake}} = [FA]_{\text{total}} \quad \left\{ \beta_1 + (1 - \beta_1) \frac{\beta_2 \beta_3}{K_1} \right\}$$
 (114)

This results in two curves, which define the wake fuel-air ratio vs. wake temperature and wake temperature vs. wake fuel-air ratio. A solution technique looks for the intersection of these curves, if it exists. This then defines the stable wake composition solution.

The fan duct gutter wakes may be supplied with hot gases from an external (to the wake) source such as a pilot region, see Figure 26. If this occurs, the external thermal source is assumed to effectively increase the inlet temperature of the recirculated air-fuel flowrate, i.e.,:

$$\dot{m}_{r}' = K_{1} \rho_{a} V_{a} \Gamma + \dot{m}_{ext}$$
 (115)

$$T_{a}' = \frac{T_{a} K_{1} \rho_{a} V_{a} \Gamma + T_{ext} \dot{m}_{ext}}{\dot{m}_{r}'}$$
(116)

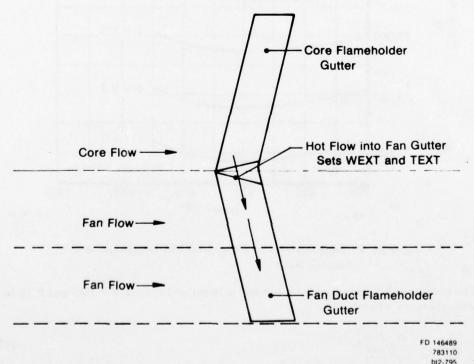


Figure 26. External Heat Addition to Fan Duct Gutters

The program then analyzes the behavior at these new conditions as if they were input.

After the wake has been analyzed, the turbulent flame penetration into the free-stream is analyzed.

The turbulent flame propagation into the unreacted free-stream is initiated in the shear layers of the wake. The model used relates the local turbulent flame speed to the local aerothermodynamic conditions and performs a finite difference integration of the flame front penetration starting in the wake and proceeding to the exhaust nozzle.

For the purposes of current analysis, the following assumptions were made:

- · Uniform air flow profiles
- Uniform fuel-air ratio
- Incompressible acceleration of free air velocity by the flameholder blockage with no induced profile
- Known wake size and reaction efficiency
- · Two-dimensional ducted flame.

The schematic of the situation which is analyzed is shown in Figure 27.

The approach flow, at known levels of pressure, temperature, velocity and fuel-air ratio, is accelerated by the blockage of the flameholder to velocity U, where:

$$U = \frac{V_a}{(1-\Gamma)}$$

Where:

U = Velocity at flameholder tip

V<sub>a</sub> = Approach velocity

Γ = Blockage ratio.

At this point, Station 1, an induced turbulence level is calculated from:

$$\epsilon_o = \left[ \left\{ C_d \Gamma + \left( \frac{\Gamma}{1 - \Gamma} \right)^2 \right\} \frac{1}{6} \right]^{\frac{1}{6}}$$

This equation relates the turbulence intensity,  $\epsilon_0$ , to the blockage ratio and the flameholder zero blockage drag coefficient,  $C_d$ .

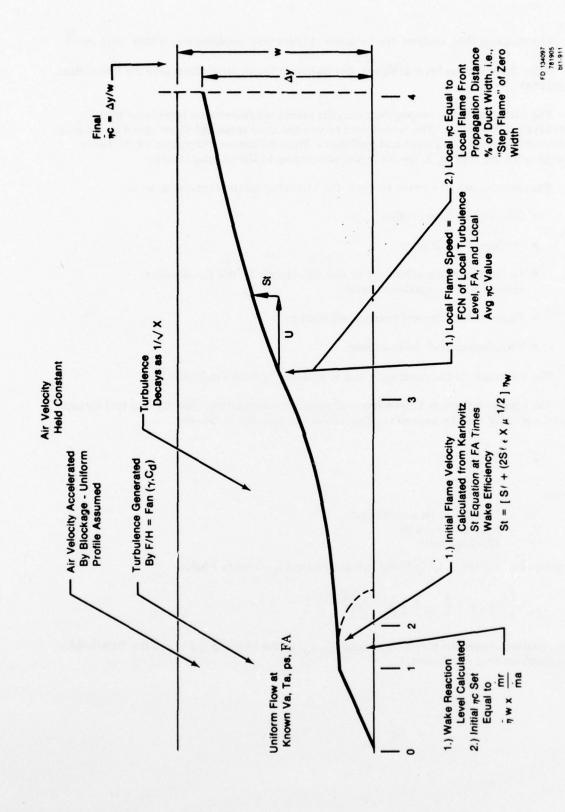


Figure 27. Schematic of Flame Spreading Analysis

At this location, the turbulent flame velocity calculations are initiated. The equation used for the local flame speed is the Karlovitz equation:

$$St = S\ell + (2u S\ell)^n$$

Where:

St ~ Turbulent flame speed, ft/sec

St ~ Laminar flame speed, ft/sec

u ~ RMS turbulence velocity, ft/sec.

The value of u'is:

$$\mathbf{u}' = \epsilon_{\mathbf{o}} \mathbf{U} \tag{117}$$

Additionally, the turbulent flame speed initial value is related to the degree of initiation of the flame speed initial value is related to the degree of initiation of the flame front by the wake by the following:

$$St' = St \times \eta_{w} \tag{118}$$

This generates an effective turbulent flame speed which completely fills the depth of the duct and propagates at the same transverse rate as the full flame speed which does not fill the duct. This arises from the fact that the inefficiencies of the wake reaction generate localized regions where flame front ignition does not occur. This use of a reduced value effective flame speed accounts for this in a two-dimensional model.

The initial value for the augmentor efficiency is the wake reaction level on a mass weighted basis, expressed as an equation this is:

$$\eta_{c_0} = \eta_w \quad \frac{\dot{\mathbf{m}}_r}{\dot{\mathbf{m}}_a} \tag{119}$$

Where:

 $\eta_{c_0} \sim \text{Initial efficiency}$  $\eta_{w} \sim \text{Wake efficiency}$ 

m<sub>r</sub> ~ Wake mass flowrate

ma ~ Total duct flowrate.

The type of flame utilized in this model is a zero thickness flame which separates a region of unreacted propellants from a region of completely reacted products. From this setup, the average local augmentor efficiency is simply the ratio of the transverse flame penetration,  $\Delta y$ , to the duct width, w.

To be consistent, the transverse location of the flame front at the initial calculation station is taken to be:

$$\Delta \mathbf{y}_{o} = \eta_{c_{o}} \cdot \mathbf{w} \tag{120}$$

This value is assigned to the first axial station. This is assumed to occur halfway down the length of the recirculation zone. From visual observations of wake stabilized flames, this is the approximate location of transverse flame initiation.

From this location downstream to the exhaust nozzle, the flame front transverse location is calculated by a finite difference integration of the local flame speed. Several axial profiles are introduced as the integration proceeds. These are:

- (1) The turbulence intensity is decayed from the value generated at the aft flameholder lip at a rate inversely proportional to the square root of axial distance over an effective jet length. The final value is set at the initial turbulence level. The effective jet length is set at 10 L/D where the D is the open area distance between adjacent flameholders.
- (2) The velocity of the unreacted fuel-air mixture is retained at the level generated at the flameholder lip. Measured profiles from several ducted flame test rigs support this assumption.
- (3) A term is introduced which relates the local flame speed to the local average duct combustion efficiency, peaking at 50%. This treats the counteracting influences of reduced heat loss as efficiency increases and reduces the free oxygen concentration. Local rates which roughly follow a sine wave function have been reported from duct data.

An additional term is added to account for the reduction in flame speed of a fuel spray compared to a premixed flame. This term relates the ratio of effective flame speed to premixed laminar flame speed. It accounts for the complicated interactions during flame spreading in an evaporating spray in a simplified manner. The effect of the liquid droplet diameter is shown in Figure 28. The droplet diameter utilized in the analysis will be the mean diameter as it exists at the flameholder trailing edge.

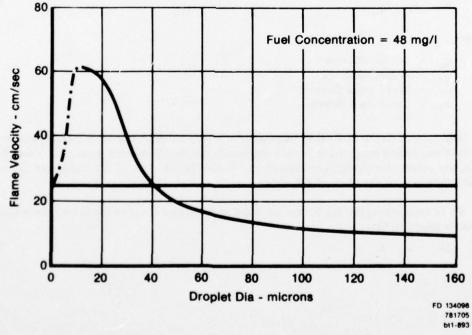


Figure 28. Flame Speed for Monodisperse Tetralin Spray

Analysis of the terms utilized for evaluation of the laminar flame speed term,  $S_{\varrho}$ , has resulted in the following:

$$S_{\ell} = S_{\ell}(\phi) \left(\frac{T_a}{540}\right)^{1.5} \left(\frac{\chi_{02}}{0.21}\right)^3$$
 (121)

Where:

 $S_{\ell} = \text{laminar flame speed at 1 atm and } 540^{\circ}$  $\phi = \text{equivalence ratio}$ 

T<sub>a</sub> = air temperature, °F

 $\chi_{02}$  = oxygen mole fraction.

The influence of pressure is indeterminate at this time and has been incorporated as  $\sqrt{P_s}$  for subatmospheric data and no influence for pressures above 1 atmosphere.

The finite difference solution uses 1 in. increments in axial length as the stepping variable. This sets a time interval:

$$\Delta t = 0.0833/V.$$
 (122)

The transverse flame penetration distance is thus:

$$\Delta y = \operatorname{St} \Delta t = y(i+1) - y(i) \tag{123}$$

where St is evaluated at the conditions of x = x(i).

The stepping procedure terminates when either:

- (1) x(i + 1) = augmentor length
- (2) y(i+1) = w.

The first defines  $\eta_c$  at the exhaust nozzle, the second defines 100%  $\eta_c$  before the nozzle. This defines one fan streamtube. The exit temperature is thus:

$$T_{ex}(i) = T_a(i) + \eta_c(i) \Delta T_l(i)$$
(124)

 $\Delta T_1(i) = \text{fcn } (T_a(i), FA(i)_{\text{effective}}).$ 

This represents the actual combustion efficiency based on the true fuel-air ratio in the streamtube.

For multi-streamtube cases, the exit and inlet conditions are mass averaged using the general equation:

$$\bar{Z} = \frac{\sum_{i=1}^{n} \dot{m}(i) \ Z(i)}{\sum_{i=1}^{n} \dot{m}(i)}.$$
(125)

The average input fuel-air ratio and average inlet temperature combine to yield the average ideal temperature rise. The average inlet and exit temperatures yield the average actual temperature use. Thus:

$$\tilde{\eta}_{c} = \frac{\Delta \bar{T}_{actual}}{\Delta \bar{T}_{ideal}}.$$
(126)

This is the chemical efficiency. The thermal exit efficiency assumes that the augmentor liner cooling air flow is included in the average exit temperature:

$$\bar{T}_{\text{exit}} = \frac{\sum_{i=1}^{n} \dot{m}(i) \ T_{\text{ex}}(i) + \dot{m}_{\text{cool}} \ \bar{T}_{\text{a}}}{\sum_{i=1}^{n} \dot{m}(i) + \dot{m}_{\text{cool}}}.$$
(127)

This reduces the average exit temperature and yields the lower value for thermal combustive efficiency. This value for  $\eta_c$  reflects the average exit temperature based on the average input fuel-air ratio and based on total fan duct air flow and fuel flow.

Before execution of the core streamtube analyses, the influence coefficients which are required are evaluated. These are of the form:

$$\frac{\partial \eta}{\partial \mathbf{A}} \quad \frac{\Delta}{\eta} = \mathbf{Z}(\Delta) \tag{128}$$

Where:

$$A = V_a$$
,  $p_a$ ,  $T_a$ , and  $FA$ .

They are calculated from a 1% change in the variables and the linear form:

$$\frac{\Delta \eta}{\Delta A} \frac{\bar{A}}{\bar{\eta}} = \frac{\eta_2 - \eta_1}{A_2 - A_1} \cdot \frac{(A_1 + A_2)}{(\eta_1 + \eta_2)}$$
(129)

Where:

$$A_2 = 1.01 A_1. (130)$$

The value of  $\eta_2$  is obtained by execution of the analysis at all the same input as  $\eta_1$ , except  $A_1$  is replaced with  $A_2$ . Thus, the analysis is done once for base and four more times for the Z factors.

## 2. DEVELOPMENT OF THE CORE STREAM COMBUSTION EQUATIONS

The same basic analysis procedure as accomplished in the duct is used in the core with several major operational differences:

- a. There is no cooling air removal from the core streamtubes. Thus, the input fuel-air ratios are used in the analysis.
- b. The droplet vaporization rate is so rapid that the fuel exists only as a vapor after a couple of inches from the spraybar. This removes the requirement to solve for the wake compositive since it is the same as the input fuel-air ratio.
- c. The wake reaction efficiency is solved directly at the input fuel-air ratio and recirculation rates which are calculated the same as the fan duct.
- d. There is no droplet size effect in the turbulent flame speed model. The rapid droplet vaporization results in gaseous phase turbulent flame penetration.

The solution for a core streamtube proceeds as follows:

- (1) The set-up equations are the same as the fan streamtubes.
- (2) The recirculation coefficient,  $K_1$ , is calculated the same way as done in the fan stream. This generates the value of  $A/V_0P^2$  required for the kinetics solution.
- (3) The wake reaction kinetics solution is performed at the same value of fuel-air ratio as input for the streamtube.
- (4) The turbulent flame penetration solution is the same as for the fan stream except that the droplet correction term is absent. The equation introduces a value for the oxygen concentration,  $\chi_{0}$ .

This value is less than the fan duct due to the removal of oxygen by the mainburner combustion process. This vitiation yields:

$$\chi_{o_2} = 0.21 \qquad \frac{\text{FA})_{\text{mB}}}{\text{FA})_{\text{stoich}}} \tag{131}$$

The analysis produces a value of  $\eta_{\rm C}$  for each streamtube, i, by the same equation as used in the fan:

$$\eta_{c}(i) = \frac{Y(i)}{w(i)} \tag{132}$$

where Y(i) is the penetration distance transverse to the flow and w(i) is the streamtube width.

The exit temperature calculation is different from the fan duct due to the vitiation of the approach air flow and the temperature removal in the turbine between the main combustor and the augmentor inlet.

The ideal temperature rise for each streamtube is evaluated by generating a fictitious main combustor inlet temperature. The procedure is as follows:

(1) For known main burner FA and streamtube inlet temperature, Ta(i), a fictitious  $\Delta T$  is read from a curve as in Figure 29.

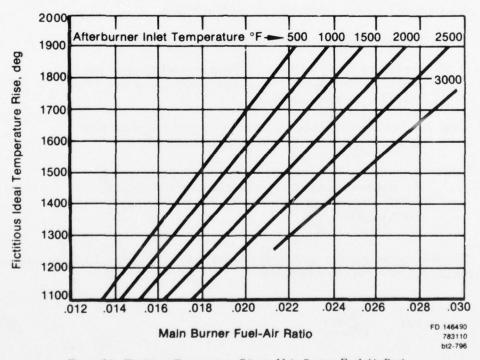


Figure 29. Fictitious Temperature Rise vs Main Burner Fuel-Air Ratio

(2) A fictitious main burner inlet temperature is calculated:

$$T'_{mB}(i) = T_a(i) - \Delta T_{flot}(i)$$
 (133)

(3) An overall fuel-air ratio is calculated:

$$FA_{oa}(i) = FA)_{mB} + FA(i)$$
(134)

- (4) With  $FA = (FA)_{oa}(i)$  and  $T = T'_{mB}(i)$ , the overall effective temperature rise is read from the ideal temperature rise curve.
- (5) The streamtube exit temperature is:

$$T_{ex}(i) = \Delta T_{I}(i) + T_{mB}(i)$$
(135)

(6) The streamtube net ideal temperature rise is thus:

$$\Delta T'_{i}(i) = T_{ex}(i) - T_{a}(i) \tag{136}$$

This value is calculated for each streamtube and used exactly as the ideal  $\Delta T$  curve is used in the fan streams. The streamtube exit temperature is:

$$T_{ex\ actual}(i) = T_a(i) + \eta_c \Delta T_i(i)$$
 (137)

The inlet temperatures and fuel-air ratios are mass averaged as is the exit temperature, using equation (125).

The overall core efficiency is calculated from steps (1) to (6) using average inlet conditions to yield the average ideal  $\Delta T$  and equations (137) and (125) for the average exit temperature:

$$\bar{\Delta} \bar{T}_{\text{actual}} = \bar{T}_{\text{exit}} - \bar{T}_{\text{a}} \tag{138}$$

$$\bar{\eta}_{c} = -\frac{\bar{\Delta} \hat{T}_{\text{actual}}}{\bar{\Delta} \hat{T}_{i}} \tag{139}$$

The influence coefficients are shown in equations (128) to (132) are evaluated as was done in the fan.

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## APPENDIX C

# LISTING OF COMPUTER PROGRAM FORMULATION

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PANVALET
THE PRUGRAM MANAGEMENT AND SECURITY SYSTEM

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     Alchibi, multi, kl, poi, lerex, bo, in, etahn
a, ucu (b), ble, umuul, buu, klvu, uyuul, y, ol, epsu, y, x' ; epsu, efac
                                                                                     6.614
                                                                                     Cicio
      X,SI ,XILL CI,CPSXLLICCI,SILLL CI,CIMLICCI,NSTEP, TAEFF
                                                                                     OLULI
                                                                                     000.2
       CUMMUN /MISC/ KHLA, MUA, AUUCI, PI, LUC, PHWIMP, ELI, KM, TFG, DEF(S)
      ASDETACISTS CLAMS MUTTLES, TLL, MUUTTLEST, TARMS STOARS TARE
                                                                                     01015
                                                                                     000.4
       CUMMUN /CHVS/ CKVMUAL+41,CKVRML+41,CKVLAM(22),CKVPV(24)
      A, UKVSL (361, UKVPK (361, TKJP4 (2031, URV [ 36 (201
                                                                                     0.6.5
      X, LKVLP7(20), LKVPf(20), LKVPTK(24), LKVSLE(10), LKVLVP(10), LKV[SP(10) UUC.0
       KEAL KM, MUA, LAMBUA, MW, MUUTV, NO, ML, MUUT, KKM, MUUTTL , MUTTLI, MUUTTUCC17
       TAR = TA + 400.
                                                                                     10.6
       LALL UNGAR (LKVMUA, 1, TAK, C., MUA, AS)
                                                                                     96014
       LALL UNBAKILKYKM, 1, TAK, ... KM, KS)
                                                                                     ULCEC
                                                                                     00021
       CALL UNDANILAVPR ,1,74,6.,FK ,KSI
       MUTELI = C.C
                                                                                     OUCLE
       DU 3. 1=1, NUL
VL = 100
                                                                                     JULGES
                                                                                     0.0.4
       MUUIV = G.
                                                                                     me ( 25
       1L = 1F0
D1 = (5.6-3)+XF/VA
                                                                                     00026
                                                                                     00021
       X = 0.
UL(1) = 3.28E-U0 * UL(1)
                                                                                     32000
                                                                                     UUC. 5
       DEI = DE(I)

RE = RHUA * (VA - VL) * DE(I) / MUA
                                                                                     00030
                                                                                     0.051
          = (2.6 + .6 * KE**.5 * PK**.33) * .5
= KM * NU / DL(1)
                                                                                     00002
                                                                                     00000
       45 = PI * UL(1) **2
                                                                                     00034
       IFIJFUEL.EC. II CALL UNBAKICKVPV, 1, TL, U.U, PV, KSI
                                                                                     CCC .5
       00036
                                                                                     JUC 37
       IFTUFUEL.EU. 21 CALL UNDAKTUNVUPI, 1, (L, C.O, LPL, 15)
                                                                                     00038
                                                                                    1.6659
       IF(JFUEL.EG.1) KHUL = -.02/776 + 1L + 56.
       IF (UFUEL.EL.Z) CALL UNDAKICAVPT, 1, TL, C. C, KHUL, 15)
                                                                                     UCC 40
       IFTUFUEL.EG.11 CPV = .00003527 # 1L + .455
                                                                                     00041
       IFTUFUEL. CO. 2) CALL UNBARTCHVUPT, 1, 1L, C.O, CPV, 15)
                                                                                     0.642
    CALL UNGAR (CRVEAM, 1, TL, J., LAMOUA, KS)
CURVE IS THE SAME FUR JP4 AND JP5
                                                                                     00043
                                                                                     ULC44
                                                                                     36645
       Idak - 400. + ((TA+16)/4.)
                                                                                     00046
      UV = KM / (RHUA + CPV)

KM = NU + LV * MW / (1040. * UL(1) * TUAK)

MUUI = KKM + AS * PS * 144. * ALUG(PS/(PS-PV))

Z = CPV * MUUI / (PI * KM * DL(1) * NU)
                                                                                     Ciccal
                                                                                     0.640
                                                                                     00045
                                                                                    nnoso
       511 = 2 /(EXP(2)-1.)
                                                                                    46651
       WOUT - HF * AS * (TA-TL) * B11
                                                                                    CCCSZ
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PRAIT & WILLIAM VER		12/07/76	PAGE	SERIAL
CSG. PAN 157		11.33.62	3	021269
COUTE = UDET - (MULT + LAMBUA)		00055		
ML = 4.109 * KHUL * (DL(1)/2.)++3		00054		
UIL = 4001L /(LPL + ML) + UT		00055		
MULIV = MULIV + MUU1 + U1		00056		
TL = TL + OTL		06057		
KHUM = 2.702 * PS / IBAK		00058		
UM = (TBAK / 400.1+4.71 + 1.1-05		06059		
AL = 20.212+KHUM++.10+UM++.04+(VA-VL)++1.16/(KH	UL+DL(11++1.64)			
UVL - AL + DT		00001		
UA = (UT * VL + (UT** + AL) / (.) * 1/.		00002		
X = X + 0x		00063		
1-(6)-MOUI - ML115,16,16		00004		
15 UL(1) = UL(1) * (IML - UT * MUUT) / ML)**.3333		00005		
1F (X - XF)16,20,26		66000		
10 UL(1) = (.6		60607		
26 BILLI) = 4 (DELLI) / DELLI**3		00000		
MOUTEL(1) = (181(1))*(MUUTE/NUL)		66009		
Multer = Multer + Moulters		00070		
146117 = 14		000/1		
36 CUNTINUE		06672		
KETUKN		00073		
tnU		00074		

PRATT & WHITNEY AIKCHAFT LIVISIUN VER		VER	12/07/78	PAGE	SCHIAL
CSG. PAN 157		10.0	11.33.02	4	021209
(	DATA SET BEBUBANUCK AT LEVEL COT AS UF 12/07/				
C	UATA SET 8456BANDUA AT LEVEL OUT AS OF 12/22/	77	00001		
C	DANUCA		00002		
	SUBROUTINE BANDLX (N,MD,AL,BAND,NSUP,NSUB)		00063		
C	N = NUMBER OF KUNS IN MAIRIX TO BE PLACED IN BA		00064		
(	MU = MATRIX DIMENSIUN IN CALLING KUUTINE, MUST B	E SQUARE	00005		
6	AC = MATRIX TO BE PLACED IN BAND		00000		
-	BANU = SINGLE DIMENSION ARRAY OF THE ELEMENTS OF A	C	00007		
C	NSUP = NUMBER OF SUPERDIAGONALS		8000		
C	NSUB = NUMBER OF SUBULAGUNALS		00009		
	CUMPLEX AL		00010		
	CUMPLEX BAND		00011		
	Ulmensiun AC(MU, MU)		00012		
	DIMENSION RANGELI		00013		
6	TEST TO DETERMINE SUPERDIAGONAL COUNT		00014		
	152 = 6		00015		
	N2 = V		00016		
21	MSS = N-NS+1		00011		
	M = NS		00.018		
	DU 22 1-1,MSS		00019		
	CALL CIF (AC(1,M),GZ3)		20020		
22	M = M+1		00021		
	152 = MSS		00022		
	NS = NS-1		00023		
	6u 10 21		66624		
23	CONTINUE		00025		
	NSUP= N-152-1		00026		
C	NSUP = NUMBER OF SUPERDIAGENALS		06027		
C	IEST TO DETERMINE SUBLIAGONAL COUNT		06028		
	152 = 6		00029		
	No = N		00036		
24	MSS = N-NS+1		06031		
	M = NS		00032		
	DU 25 1-1,MSS		00033		
	LALL LIF (AC(M, 11, 620)		00034		
25	M = M+1		00035		
	152 = M55		00000		
	NS = NS-1		00637		
	00 TU 24		00038		
26	CONTINUE		66009		
	NSUE = N-154-1		00040		
C	NOUL - NUMBER UF SULUIAGUNALS		00041		
	METUKN		00042		
	t w O		00043		

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PRATT & WHITNEY AIRCRAFT DIVISION
                                                                              VER
                                                                                           12/07/78
                                                                                                              PAGE
                                                                                                                           SEKIAL
CSG.PAN757
                                                                             10.0
                                                                                           11.33.02
                                                                                                                           041269
              DATA SET B280BETA3 AT LEVEL 001 AS OF 12/07/78 E33
       SUBROUTINE BETAS
                                                                                            00001
              EVALUATES VAPURIZATION OF CULLECTED FUEL WITH ASSUMED WAKE
C PUKPOSE
                                                                                            90002
                TEMPERATURE
                                                                                            00003
               (INITIAL WAKE TEMP = 3000)
                                                                                            00004
       CUMMUN /CINPT/FHW, PFSR, PS, TFSK, JFUEL, VA, TA, XF, TAU, ALPHA, FAR
                                                                                            00005
      X,XL,EPS,CUFH,FARMB, ISTRM, WEXT, TEXT
                                                                                            00006
       CUMMUN /OIPUT/ MOUTA, MOUTF, MOIFLO, MOTFVO, BETA1, B2, DL(5), B1(5),
                                                                                            00007
      XTLF(5), MDTFC, K1, PS1, TLFEX, B3, IW, ETAFH

X, DLU(5), B1E, DMDUT, BDC, R1VD, DUQUTU, Y, SC, EPSO, V, XO, EPSO, ETAO

X, STC, X1(100), EPSX1(100), ST1(100), ETA(100), NSTEP, TAEFF

CUMMUN /MISC/ RHUA, MUA, ADUCI, PI, LDC, FHWTMP, B1T, KM, TFO, DLF(5)

X, BE 1A2(5), ETAW, MD1FL1, TLC, MUU(FL(5), FAKW, STBAR, FARE
                                                                                            00006
                                                                                            00004
                                                                                            00010
                                                                                            00011
                                                                                            00012
       CUMMUN /LRVS/ CRVMUAL 44), LRVKM(44), LRVLAM(22), CRVPV(24)
                                                                                            00013
      X,CRVSL(36),CKVPR(30), TKJP4(283),CKVFSL(26)
                                                                                            00014
      A,CKYCPT(26),CKYPT(26),CKYPTK(24),CKYSLE(16),CKYEYP(16),CKYTSP(16) 000.5
        EXTERNAL B3DQD2 .B3DQD1
COMMON /DGDT1/ DGDUT
                                                                                            00016
                                                                                            06617
        CUMMUN /DUUT/ DMDUTI, TLI, TAULC, B
                                                                                            00018
       KEAL MOUTE, MUA, MOTVI, KM, MOTFC
                                                                                            00014
       KAD = .01745
                                                                                            00020
       N = 2 L
                                                                                            00021
       DX = FHWIMP / (2. +N+SIN(ALPHA+RAD))
                                                                                            00022
       DAS = .0833 * UX
DV = KM /(.55 * KHUA)
                                                                                            00023
                                                                                            00024
        MDOTC = MDTFC / 2.
        DMDUTL = MDUTL / N
                                                                                            00026
       WNU = 0.558 * ( KHUA * VA * FHWTMP / MUA) **.5
                                                                                            00027
                                                                                            00048
       U-DUTU = 10. * U-UUT
                                                                                            00029
     CURVE IS THE SAME FUR JP4 AND JP5 CALL UNBAK (CRVLAM, 1, TLC, 0.0, TAULC, KS)
                                                                                            00030
                                                                                            16000
        IF (DWDUT .GT. (DMDDTC * TAULC))GU TU 100
DMDUT1 = DMDDTC
                                                                                            00032
                                                                                            00053
                = C.0
= TLC
        TYTOM
                                                                                            00034
        TLI
                                                                                            00005
                                                                                            00036
  10 ANU = .0236 * (KHUA * J * UX + VA / MUA)++.0
                                                                                            00037
                = .0838 # UX # (TA+460.1/(XNU * UV # PS # DAS)
                                                                                            86000
     TMX1 = DQDUT / (DMDUT1 * .55) + TLI
CURVE IS THE SAME FUR JP4 AND JP5
CALL UNBAR(CRVLAM,1,TLI,G.C,TLAM,15)
                                                                                            00039
                                                                                            000-0
                                                                                            06641
        IMX2 = 5060.85 /(11.157 - ALUGIPS+(1.-EXP(-DUDUT+6 /TLAM))))-460.00042
             = TMA1
                                                                                            06043
        IF (TMX2 .LT. TMX1)TXK = TMX2
                                                                                            00044
        TAL = TLL
                                                                                            UU045
                                                                                            00040
        CALL REGULATIAL, TXK, 630401, 630402, KJ, TLFEX, 040T, TERI
                                                                                            00047
        IF(IER .GT. 0)GO 10 1000
                                                                                            00048
        DEUTS = DMUUTI#.55#(TLFEX-TL1)
        DEDUTE = DUDUT - DUCIS
                                                                                            00000
                                                                                            00051
                = (TLFEX*(UMUUT1 - UMUTV) + TLC * DMOUTC) /
                                                                                            90652
```

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PRATT & WHITNEY AIRCKAPT UIVISIUN		12/01/18	PAGE	SEKIAL
CSG. FAN 151		11.33.02	6	021204
X (UMUUTI - UMUTV + UMUUTC)		00053		
JEDUNU + VIUMU - LIUUMU = 11JUMU		00054		
VIUMU + IVIUM = IVIUM		0(0>5		
J = J + 1		00056		
1F(J-N)10,10,50		00057		
SC b3 = MUTYT / MULTL		00058		
60 16 1066.		00059		
100 CUNTINUE		00000		
C 100 WRITE(6,101)		00061		
C 101 FURMATIO WAKE HEAT FLUX GREATER THAN LATENT HEAT!		00062		
B5 = 1.		01663		
1000 KETUKN		00004		
ENC		00065		

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PAGE 7
PRATT & WHITNEY AIRCRAFT DIVISION
                                                                                                  12/07/78
                                                                                    VEK
                                                                                                                                     SERIAL
                                                                                   10.0
CSG. PANIST
                                                                                                                                     021269
              UATA SET BEBURNAT AT LEVEL GOT AS UP 12/07/76 E33
CATA SET BEBURNMELE AT LEVEL GOT AS UP 62/27/76
UATA SET BESCHMAT AT LEVEL GOT AS UF 12/22/77
C
C
                                                                                                    00001
                                                                                                   00002
C
                                                                                                    00003
        SUBRUUTINE BMAT (NP, NB, NK, BANU, LERK)
                                                                                                    00004
        CUMPLEATIO DANC
                                                                                                    00005
        UIMENSIUN DANULLI
                                                                                                    00006
        BAND MATKIX DECEMPUSITION
                                                                                                    00007
        UNLY THE BAND ELEMENTS OF THE MATKIX ARE STURED IN THE ARRAY BAND.00008 THE ELEMENTS ARE STURED KOW BY KOW SUCH THAT THE DIAGONAL ELEMENTSOCOUS
        FURM A LULUMN.
        THE BAND MATRIX A 15 DECUMPUSED INTO LO (LOWER AND UPPER TRIANGULACOOT)
        THE ELEMENTS OF THE DECUMPOSED MAIRIX LO ARE STORED IN THE SAME ARGODIZ BAND WHERE THE DIAGONAL ELEMENTS OF L ARE ASSUMED TO BE 1. 00013 SUBROUTINE SULBAN USES THE MAIRIX FORM LO TO SULVE FOR X, GIVEN ANOGOL4
        CULUMN VECTUR B.
                                                                                                    00015
        VARIABLE DICTIONARY FOR ARGUMENT LIST
                                                                                                    00016
        NP = NO. UF SUPERVIAGONALS IN BAND MATRIX
ND = NO. UF SUBDIAGONALS IN BAND MATRIX
NR = NO. UF RUMS IN BAND MATRIX
                                                                                                    00017
                                                                                                   00018
                                                                                                    00014
        BANU(1)= ARRAY CUMIAINING THE BANU ELLMENTS OF THE BAND MATRIX. No. = NP + NB + 1 10 = NB + 1
                                                                                                    00020
                                                                                                    00021
                                                                                                    00022
        NEL= NL + NK
                                                                                                    00023
        CUNTINUE
                                                                                                    00024
        CALL LILL DANULLUI, 650 1
                                                                                                    00025
        60 1U 40
                                                                                                    00026
 50
        CUNTINUE
                                                                                                    00027
        DU 300 1=1.Nb
                                                                                                    00048
        L = 10 + 1 +(NC-1)
                                                                                                    00029
        Irth .61. NELI GO 10 316
                                                                                                    00030
        BANULLI = BANULLI / BANULIDI
                                                                                                    00031
        J = L
                                                                                                    00032
                                                                                                    00033
        DU 200 11-1.NP
                                                                                                    060 34
        IF 1 NP .EC. 6 1 GU TU 200
                                                                                                    00035
                                                                                                    00036
        K = K + 1
                                                                                                    00037
        BANULUI = BANULUI - BANULLI * BANULKI
                                                                                                    00038
 400
                                                                                                   00039
        CUNITIVUL
 SOC CUNTINUE
 310
        CUNTINUE
                                                                                                    00041
        10 = 10 + NL
                                                                                                    00042
        17 110 .LI. NELI 60 TO 25
                                                                                                    06643
 999 KETUKN
                                                                                                    00044
 40
        WKIIE 10,411 10
                                                                                                    00045
       FORMAL (21h ULAGONAL ELEMENT NG., 14, * 15 ZERU GURING BAND MATKINUSCHOLI DECUMPUSITION NUN ABURTEU * )
        ICHK - 1
                                                                                                    CCC 48
        66 16 999
                                                                                                    00044
```

00000

大きない アンススキンサンシャルを

END

VER 16.0	12/07/16	PAGE	SEK1AL 021269
/76 E33	00001 00002 00003 00004		
		10.0 11.33.02 776 E33 60001 60002 60003	10.0 11.33.02 8  778 E33  CCCC1  CCCU2  CCCO3  CCCC4

PRA	ATT & WHITNEY AIRCRAFT DIVISION	VEK	12/07/78	PAGE	SEKIAL
CSG	. PAN757	10.0	11.33.02	7	021269
C	LATA SET B2BDB3DWDZ AT LEVEL 001 AS UF 12/C7/78	E33			
	FUNCTION B30Q02(X)		00001		
	CUMMUN /CINPT / FMW, PFSR, PS, TFSK, JFUEL, VA, TA, XF, TAU,	ALPHA, FAR	XL , 00002		
	XEPS, CUFH, FARMB		00003		
	CUMMUN /BUDT/ UMUUTI, ILI, TAULC, B		00004		
	B3D4D2 = 10MUGT1 * .55) * (X-TL1) + (AULC * 1. / B	* ALUGIPS	11P3 00005		
	X - EXP(11.157 - 5000.05 / (X + 400.1)))		00006		
	KETURN		00007		
	ÉND		00008		

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PRATT & WHITNEY AIRCKAFT LIVISIUN
                                                                                           12/67/16
                                                                              VEK
                                                                                                              PAGE
                                                                                                                           SEKIAL
CSG. PAN 757
                                                                             10.0
                                                                                           11.33.62
                                                                                                                10
                                                                                                                          0,1/64
              DATA SET BEBUCHECK AT LEVEL GOT AS UP 12/07/78 E33
                                                                                            00001
         SUBRUUTINE CHECK
        CUMMUN /PLUG/ TITLE, STITLE
                                                                                            000002
       CUMMUN / FLAMIN/ ALFHAC(100), ALPHAN(100), FAC(100), FAH(100),
                                                                                            00003
      * FHWC(100), FHWH(100), LSC(100), LSH(100), NSC(100), NSH(100), # PFSK(100), TAUC(100), TAUH(100), TEXT(100), TFSK(100),
                                                                                            00004
                                                                                            00005
      * Tollibus, Tonicos, WEXTILCO, ALLIBOS, ALHIEGS, NIC, NTH
                                                                                            00006
                                                                                            00007
       CUMMON /KMBLIN/ BPR, UPCS, UPU, DPH, UPHS, UPS, EPSC, EPSH, ETA,
                                                                                            00006
      * ETAL, ETAH, FA, FAV, LA, LB, LL, LH, LI, LK, LZ, MOL, MOH, MOK,
      * PKNUZ, PSO, Tom, ZEF, ZEFL, ZEF m, ZEFP, ZEP, ZEPC, ZEPH, ZETL,
                                                                                            66665
      * ZETH, ZEVL, ZEVH, TLUNE, WLUUL
                                                                                            00010
        CUMMUN /AUGIN/ JEUEL, NAUGUP, NCUMUP, NESUP, NPKNTK, NPKNTF
                                                                                            ULGII
         KEAL LA, LE, LL, LH, LI, LK, LZ, MOC, MOH, MOK, LSL, LSH
                                                                                            00012
         EWUIVALENCE (RILL, EPK)
                                                                                            00013
      DIMENSION NAM1(39), NAM2(39), DEAULI (37), TALE
* NAM3(28), NAM4(28), DEI(22), K(39), IDET(10)
DATA NAM1 / HEBEK , HEDPUS, HEDPU , HEDPH , HEDPHS, HEDPS ,
HEPSU, HEPSH, HETA , HETAU, HETAH, HERA , HEAV ,
HEPSU, HEPSH, HETA , HETAU, HELTAH, HERA , HEAV ,
        DIMENSIUN NAM1(34), NAM2(34), DFAULT(34), IIILE(20), STILLE(14), 00014
                                                                                            00015
                                                                                            01016
                                                                                            00017
              ARLA , ARLB , ARLC , ARLR , ARLI , ARLK , ARLZ , ARM6C , ARM6R , ARM6K , ARPRNU, ARPSO , ART3R , ARZER ,
                                                                                            00018
                                                                                            00019
                                                                                            00020
              ANZERC, ANZERH, ANZERP, ANZER , ANZERC, ANZERH, ANZERC,
        HAZETH, HAZEVC, HAZEVN, HATCOK, HHWCOUZ
UATA NAME / 2344H , HAZ , 1344H , HHE , HHL ,
UATA NAME / HATC , HANTH , HALPH, HHEAC , HHENG, HALSO ,
                                                                                            00021
                                                                                            00022
                                                                                            000.3
      * 4HNSC , 4HPFSK, 4HTFSK, 4HTAUC, 4HIEXT, 4HWEXT, 4HTCC , 4HALL , * 4HALPH, 4HFAH , 4HFHWH, 4HLSH , 4HNSH , 4HTAUH, 4HIGH , 4HZH ,
                                                                                            00024
                                                                                            00025
      * 4HUFUE, 4HNAUG, 4HNCUM, 4HNFSU, 4HNPKN, 4HNPKN /
                                                                                            00026
        UATA NAM4 / 2*4H , 4HAC , 11*4H , 4HAH , 7*4H , 4HL , 4HUP , 4HP , 4HTK , 4HTF / DATA DEAULT / .54, C., .064, .032, O., O.,.O4,.O4, O., .4, .41,
                                                                                            00027
                                                                                            00028
                                                                                            00024
      * 0., .021, 82., 60., 72., 14., 5., 60., 30., .15, .28, .22, 4.4,
                                                                                            00030
      * 1.92,1355.,0.,-5.5,.4,0.,0.,0.,0.,0.,0.,0.,0.,0.,0.,.0.5, 0./
                                                                                            00001
        DATA DET / 1, 1, 1, 1, 1, 1, 2, 1, C, 1/
DATA DET/ 1., 1., cu., .0595, 1.06, 4.0, 1., 134.7, 566., .206,
                                                                                            00032
                                                                                            000 33
      * 0., 0., 700., 66., 60., .04, .75, 8.0, 1.1 .186, 1775., 66./
                                                                                            00044
        UATA TL / .061 /
                                                                                            06035
         IF (NAUGUP.Ew.1.AND.NCUMUP.Ew.1.AND.NFSUP.Ew.1) WKITE (6,1010)
                                                                                            00036
                                                                                            00057
            (NAUGUP.EW.1.ANU.NCUMUP.EW.1.ANU.NFSOP.EW.2) WRITE (6,1011)
         IF (NAUGUP.EU.2.AND.NCUMUP.EW.1.AND.NFSOP.EW.1) WKITE (6,1012)
                                                                                            00008
         IF (NAUGUP.EU.Z.ANU.NCUMUP.EU.I.ANU.NFSUP.EU.2) WKITE (0,1013)
                                                                                            00039
         IF (NAUGUP-EN-3-AND-NCUMUP-EN-1-AND-NFSUP-EN-1) WRITE (6,1014)
                                                                                            000-0
         IF (NAUGUP-EW-3-AND-NCUMUP-EW-1-AND-NFSOP-EW-2) WRITE (0,1015)
                                                                                            00041
            (NAUGUP.EU.1.ANL.NCUMUP.EU.2.AND.NFSOP.EU.1) WRITE (6,1016)
                                                                                            00042
                                                                                            00043
         IF (NAUGUP.E4.1.AND.NCUMUP.E4.2.AND.NFSUP.E4.2) WRITE (0,1017)
         IF (NCUMUP.EW.3) WKITE (0,1018)
                                                                                            00044
         WRITE (6,1619) STITLE
                                                                                            00045
        FURMAT (1H1, RUMBLE MUDEL WITH VEEGUTTER FLAMEHULDER AUGMENTUR ANDCC+6
      *U PRUXIMATE FLUW SPLITTLE USING EMPIRICAL CUMBUSTION DATA*,//) 00047 FORMAT (1H1,*RUMBLE MODEL WITH VEEGUTTER FLAMEHULDER AUGMENTUR ANOOG48
      *D REMUTE FLUW SPLITIER USING EMPIRICAL COMBUSTION DATA" ,//)
                                                                                           00044
 1012 FURMAT ()H 1, "KUMBLE MUDEL WITH VURBIX AUGMENTOR AND PRUXIMATE FLUGGGSG
                                                                                           00051
      *W SPLITTER USING EMPIRICAL CUMBUSTION DATA 1,7/1
 1013 FURMAT (1H1, *KUMBLE MODEL WITH VURBLX AUGMENTOR AND KEMOTE FLOW SOC052
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PRATT & MHITNEY ALKUKAFT DIVISION
                                                                               12/01/78
                                                                                                PAGE
11
                                                                    VEK
CSG.PAN757
                                                                               11.33.02
     *FLITTER USING EMPIRICAL CUMEUSTION DATA",//I
                                                                                CU053
 1014 FURMAT (1m1, "KUMBLE MUUEL WITH SWIKL AUGMENTUR AND PRUXIMATE FLUWOCO54
     * SPLITTER USING EMPIRICAL CUMOUSTION DATA .///
                                                                                00055
 1015 FURMAT (1H1, *KUMBLE MUDEL WITH SWIRL AUGMENTUK AND KEMUTE FLUW SPOGOS
*LITTER USING EMPTRICAL CUMBUSTION DATA*,//) CCO57
 1016 FURMA'I (IR), RUMBLE MUDEL WITH VEEGUITER FLAMEHULDER AUGMENTUR ANDGOS
     *U PRUXIMATE FLUM SPLITTER USING FLAMEHULDER CUMBUSTION MODEL CUMBUGGOS
     +STILN DATA . . // )
                                                                                00000
 1017 FURMAT (THT) . RUMBLE MUUEL WITH VEEGUITER FLAMEHULDER AUGMENTOR ANDOOG
     *U REMUTE FLUW SPLITTER USING FLAMEHULDER COMBUSTION MODEL COMBUSTIONO62
     *UN UATA . . / / )
                                                                                60003
 1010 FURMAT (1H1, "FLAMEHOLDER MUDEL UNLY" ,//)
                                                                                00004
 1614 FURMAT (1X, 1944,//)
                                                                                00065
       FURMAT ILA: **** WARNING - PARAMETER ", ZA4, " = ", Gl1.5, " IS A DEFAUUGGO
     +ULT VALUE ! !
                                                                                G00c7
       FURMATILES, *** WARNING - PARAMETER . . 244, = . , 11, 10x, 15 A DEFACCOD
     *ULT VALUE ! 1
                                                                                00069
      IFIADSIDPA-UFAULTILLI.LE. ILIWKIIE(0,1 INAMI(11, NAMZ(11,KI))
                                                                                66610
       1F(ABS(FAV-DFAULT(13)).LE.TL)WK11E(0,1)NAM1(13),NAM2(13),K(13)
                                                                                00071
       IF(JFUEL.EW.10F1(5)) # KITC(6,2) NAM3(23), NAM4(23), 10FT(5)
                                                                                00012
       IF (ABS(MOC-UFAULT(21)).LE.TLJWKITE(6, IJNAM1(21), NAM2(21),R(21)
                                                                                00013
      IFIADSIMON-UFAULTIZZII.LE.TLIMKITELO, IINAMILZZI, NAMZIZZI, KIZZI
                                                                                00614
       IFINCUMUE. EU. LOFTITII WKI TE (6, 2) NAM3 (25) NAM4 (25), LOFTITI
                                                                                60015
      IF(Abs(PSo-DFAULT(25)).LE. [L] WKITE(6, 1) NAM1(25), NAM2(25), K(25)
                                                                                00016
          INCOMUPACE. 31 GU TU 300
                                                                                00017
       IF (ABS (UPU-DFAULT(3)).LE. [L]WKIIE(6,1)NAM1(3),NAM2(3),K(3)
                                                                                01010
       IF (ABS LUPS-UFAUL) 1011.LE. ILIWALIE (0,1 INAMI (0), NAMI (0), K (0)
                                                                                00014
       1 F ( ADS ( LA - UF AUL ( ( 14 )) . LE . ( L ) WK 1 ( E ( D , 1 ) NAM . ( 14 ) + NAM 2 ( 14 ) . K ( 14 )
                                                                                00000
       IF(ABS(LC-DFAULT(10)).LE. (L)WKI (E(0,1)NAM1(10),NAM2(10),K(10)
                                                                                00001
       IF(ADS(LH-DFAULI(17)).LE.ILJWKITE(6,1)NAM1(17),NAM2(17),K(17)
                                                                                0(662
       IF (AESIL2-Draulf(201).LE. FLINKITE(6,1)NAM1(201,NAM2(20),R(20)
                                                                                0 0083
       1-1485 (MOK-DFAULT12311.LE.TL) WKITE (0, 11NAM1(231, NAM2(23), K(23)
                                                                                00004
       1FINE SUP. EU. 10F1 (B) /WK1 (E10, 2) NAM3 (20), NAM4 (20), 10FT (B)
                                                                                00005
       IF (NPKNIK. EU. 10+T(9)) WK11c(6, 2) NAM3(27), NAM4(2/). 10+T(9)
                                                                                00000
       1F(ABS(PKNUZ-UFAULT(Z4)).LE.TL)WKITE(6.1)NAM1(24).NAM2(24).K(24)
                                                                                00087
       IF (ABS(TCURE-UFAULT(30)).LE.TL)WKITE(6,1)NAM1(38),NAM2(38),R(38)
                                                                                CCCBB
       1F(NAUGLP.E4.1DFT(6)) WRITE(6,2) NAM3(24), NAM4(24), 1DFT(6)
                                                                                06000
       IF INAUGUP.NE. 11 GU TU 200
                                                                                00090
       IF (ABS(UPn-UFAULT(4)).LE.TLJWKITE(6,1)NAM1(4),NAM2(4),R(4)
                                                                                06041
       IF INCUMUP.GE. 21 GU 10 300
                                                                                00042
       IF (ABS (ETAC-DFAULT (1611.LE.IL JWK1 (E(6.1)NAM1 (10).NAM2 (10).R(10)
                                                                                01.093
       IF (ADSIETAH-DEAULICITE).LC.TL WKITE(6, 1)NAM1(11),NAM2(11),K(11)
                                                                                00044
       1F(ADS(FAC(1)-UFT(4)).LE. [L]WK11E(6,1]NAM3(4),NAM4(4),DFT(4)
                                                                                00045
       1F(ADS(FAR(1)-UFT(10)).LE. TL | WK1 (E(0, 1) NAM3(10), NAM4(10), DF ((10)
                                                                                00000
       IF (ABSILB-DFAULT(15)).LE. ILIWKIIE(6,1)NAM1(15),NAM2(15),K(15)
                                                                                00647
       IF(AES(LI-UFAUL)(16)).LE. [L | WK1 [E(6,1 ) NAM 1 (18), NAM2(10) + K(10)
                                                                                00048
       1+(ABS(LK-DFAULT(19)).LL.(LJWK1)E(6,1)NAM.(19),NAM2(19),K(19)
                                                                                00075
       IFIADS (LSC (I )-UFT(O)) . LE. (LINKI LELO, I INAMS(O), MAM4(O), DFT(O)
                                                                                00100
       1 - ( + b) (L) - ( 1) - D-T ( 10 ) . LE . TL / WKITE ( 0, 1 / NAM3 ( 18 / NAM4 ( 18 ) , DFT ( 18 )
                                                                                ocici
       1F(AUS(10C11)-UFT(13)).LE.7L1WR1fc(6,1)NAM3(13),NAM4(13),UFT(13)
                                                                                06102
       IF(ADS(Ton(1)-UFT(21)).LE.TL)WKITE(0,1)NAM3(21),NAM4(21),UFT(21)
                                                                                00103
       ITTABSTEET-UTAULTEDIT.LE.ILIWKITEG, LINAMITEBI, NAM2(20), RTEBI
                                                                                00164
       IF(AbS(ZeFH-LFAUL)(ZY)).LL.TL, WK1TE(6, 1)NAM1(29), NAM2(ZY), R(Z9)
                                                                                06105
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                                                                                                         021209
                                                                              00100
      ir(ADS(ZEPC-UFAULT(32)).LE.TLIWK1[E(0,1]NAM1(32),NAM2(32),K432)
      IF (ADS (ZCPH-UFAUL TIDS ) 1.LE. TL | WKITE (0, 1) NAM [ 133 ], NAM 2 (33), K (33)
                                                                              00117
      IF(ADS(ZEIC-DFAUL!(34)).LE.IL JWK11E(0,1)NAM1(34),NAM2(34),R(34)
                                                                              CUICE
      1F(ADS(ZETH-DFAUL)(35)).LE.TLJWK11E(6,1)NAM1(35),NAM2(35),R(35)
                                                                              00109
      1 - ( ABS ( ZEVU - DEAULT (301) . LE . TL | WK | [E (6 , 1 | NAM1 (30) , NAM2 (30) , K (30)
                                                                              00110
      1F(ADS(ZEVH-DFAUL)(37)).LC. IL JWK11E(6,1)NAM1(37),NAM2(3/),K(3/)
                                                                              UULLI
      KETUKN
                                                                               00112
  200 1- (NAUGUP.NE.2) GO TU 250
                                                                              00113
      IFLABS (DPH-UTAULT 141) .LE. ILIWKITE(0,1 INAM 1(4), NAM 2(4), K14)
                                                                              00114
                                                                              00115
      bu 14 215
  250 IFLABS (DPUS-DFAUL ((2)). LE. TLINRITE (0, 1) NAM1 (2), NAM2(2), R(2)
                                                                              00116
      IF (ADS (CPMS-LFAUL )(S)). LE. TLINKITE (O, INAMI(S), NAM2(5), K(5)
                                                                              00117
  275 IF (ADSIETA-UFAULT (9)) . LE. FLIWKITE(6, 1) NAM 1(9), NAMZ(9), K(9)
                                                                              00118
      1F(#35(FA-UFAUL)(121).LE.ILJWK11E(0,1)NAM1(12),NAM2(12),K(1
                                                                              00119
      IF(ADS(LB-UFAUL)(15)).LE. [L]WKITE(6,1)NAM_(15),NAMZ(15),K(15)
                                                                              00120
      IFIAESILI-UFAULIIIBII.LC. ILIWKIIEIO, LINAM. 1261, NAM21181, KIIB)
                                                                              00121
      IF(ABS(LK-DFAULI(191).LE.ILJWK1(E(0.1JNAM1(19).NAM2(19).K(19)
                                                                              00122
      IF(ABS(TOC(1)-DFT(13)).LE.TL)WKITE(6,1)NAM3(13),NAM4(13),UFT(13)
                                                                              00123
      ITTHES (TORILI-UFT(21)). LE. TLINKITE(O, I) NAM 3(21), NAM4(21), UFT(21)
                                                                              00144
      1F(ABS(ZEF-UFAULT(27)).LE.TL)WKITE(0, 1)NAM1(27), NAM2(27), K(27)
                                                                              00145
                                                                              00126
      IFLADSIZEFP-DRAULTISOII.LE. FLIMMITELO, LINAMILISOI, NAMZISOI, KISCI
      IF(ABS(ZEP-DFAULT(31)).LE.TL)WKITE(6,1)NAM1(31),NAMZ(31).K(31)
                                                                              00127
                                                                              00128
      KETUKN
  3CC 1F(ADS(ALPHAC(1)-UFT(3)).LE.TL)WKITE(6,1)NAM3(3),NAM4(3),UFT(3)
                                                                              00129
      1F(ADS(ALPHAM(1)-OF)(15)).LE. IL JWK1 (6 (6,1) NAM3(15), NAM4(15), DFT (
                                                                              00130
     4151
                                                                               00131
      IF (ABS (EPSC-DFAULT (7)).LE.TL)WRITE(0, 1)NAM1(7), NAM2(7), DFAULT(7)
                                                                              00132
      IFIABSIEPSH-DFAULITETT.LE. [LINKIIE(O, INAMI(BI, NAM2(BI, UFAULITB)
                                                                              00133
      1 F (AbS (FAC (1) - UF) (4)) . LE . I L JWK1 (E (0, 1 JNAM 3 (4), NAM + (4), DF) (4)
                                                                              06134
      1 F(ADS(FAR(1)-DFT(10)).LE. TL) WK1TE(0, 1) NAM3(10), NAM4(16), DFT(16)
                                                                              00135
      IF (ABS(FHWC(1)-0FT(5)).LE.TL)WKITE(0,1)NAM3(5),NAM4(5),DFT(5)
                                                                              00136
      1F(ADS(FMMM(1)-UFT(1/1).LE.TLINKITE(0,1)NAM3(17),NAM4(17),DFT(1/)
                                                                              00137
      IFIABSILSC(11-OFTIO)).LE.ILIWKIIE(O,1)NAM3(O),NAM4(O),DFT(O)
                                                                              00138
      IF(ABS(LSm(1)-DFT(10)).LE.TL)WK1TE(0,1)NAM3(18),NAM4(18),DFT(18)
                                                                              00139
      IF (NPKNIF.EU. LUFT(16) JWK1 IE (6, ZJNAM) (28), NAM4(28), LUF' (16)
                                                                              06140
      1 - (ABS(NSC(1)-UFT(7)).LE. (L)WK1(E(O,1)NAM3(7),NAM4(7),DFT(7)
                                                                              061-1
      1F(ADS(NSH(1)-DFT(19)).LE.TL)WK1TE(6,1)NAM3(19),NAM4(19),DFT(19)
                                                                              00144
      IFIADSINTC-UFT(1)).LE.TLIWKITE(6,1)NAM3(1),NAM4(1),OFT(1)
                                                                              00143
      IFIADS (NIH-UFICE) .LE. TLINKITE (0, 1) NAM3(2), NAM4(2), UFICE)
                                                                              00144
      IFIABS(PFSKII)-DFT(0)).LE.TLIWKIIE(0, IINAM3(8), NAM4(6), DFT(0)
                                                                              06145
      IF(ABS(IAUC(1)-UFT(10)).LC. TL JWKIIE(0,1)NAM3(10),NAM4(10),DFT(10) 00146
      1F(ADS([AUH(1]-DFT(20]).LC.[L]WK11E(0,1]NAM3(20],NAM4(20),DFT(20) 00147
      IF(ABS(TEXT(1)-UFT(11)).LE.TL; WKITE(6,1)NAM3(11),NAM4(11),UFT(11) 00140
      1F(ABS(1FSK(1)-UF)(9)).LE. IL )WKITE(0, 1)NAM3(9),NAM4(9),UF((9)
                                                                              00149
      IFTABS(TON-UTAULTIZOTT.LE. TLIMKITCIO, INAMITZOT, NAMZ 1201, KIZOT
                                                                              00150
      1F(#65(160(1)-UFT(13)).LE. |L| WK1]E(0, 1)NAM3(13), NAM4(13), UFT(13)
                                                                              00151
      1F(AbS([om(1]-UF)(21)).LE.TL)WKITL(6,1)NAM3(21),NAM4(21),UFF(21)
                                                                              00152
                                                                              00155
      IFIADS (WOULL-UFAULTISS) .. LE. TEJWRITE (O.1) NAM1 (39) . NAMZ (39) .
                                                                              00154
     4K (34)
      IF(AES(WEAT(1)-OF(122)).LE.TEJWKLIE(6,1)NAM5(12),NAM4(12),DFF(12) 06155
      IF(ABS(ALC(1)-DFT(14)).LE.TL; WKITE(0, 1)NAM3(14), NAM4(14), UFT(14)
                                                                              66156
      1 F (ADS (XLm(1) - DFT (22)). LC. TL | WK1 TE(0, 1) NAM3 (22), NAM4 (22), DFT (22)
                                                                              00157
      KETURN
                                                                              66158
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PRATT & MILINEY ALRCKAFT DIVISION CSG.PAN757

END

VEK 10.0 12/07/76

AGE 13 SEKIAL 021267

100000000000000000000000000000000000000	IT & WHITNEY AIRCRAFT DIVISION PAN757	VER 10.0	12/07/78	PAGE 14	SERIAL 021269
c	DATA SET BEEDCID AT LEVEL OOL AS UF 12/07/78	E33			
C	DATA SET 8458CID AT LEVEL 001 AS UF 12/22/77		00001		
	SUBROUTINE CIDE A, + 1		00002		
	CUMPLEX*10 A. AA		00003		
	REAL*8 6(2)		00004		
	EQUIVALENCE: AA, b(1))		00005		
	AA = A		00006		
	IF ( B(1) .NE. 0.000 ) KETUKN 1		06007		
	IF ( b(2) .NE. C.COL ) KETUKN 1		83030		
	RETURN		06009		
	END		00010		

	TT & WHITNEY AIRCRAFT DIVISION .PAN757	VER 10.0	12/07/18	PAGE 15	021269
•	DATA SET BEBULLE AT LEVEL OOL AS UF 12	/07/7H 633			
č	DATA SET 8458CIF AT LEVEL GOT AS UF 12		00001		
-	SUBRUUTINE LIF (A,*)	, , , , , ,			
			00002		
	CUMPLEX A, AA		00003		
	DIMENSIUN 6(2)		06604		
	EUUIVALENCE JAA, B(1))		00005		
	AA= A		00000		
	1F (B(1) .NE. O.) RETURN 1		00007		
	1F (8(2) .NE. O.) KETUKN 1		00008		
	KETURN		00009		
	END		00010		

C DATA SET BEBUCULECT AT LEVEL (CT AS OF 12/07/70 E33 SUBBUDTINE CLUECT (MUL) 00001 C PURPOSE FUR EACH DRUPCET SIZE GROUP 00002 C 1 12 VALUATE MASS IMPINUEMENT RATE ON FIR SURFACE 00004 C 2 SUBMAILEN SETS TOTAL MASS RATE UNTO FIR OCCOGNOMINATION FOR PROPERTY OF SETS OCCOGNOMINATION FOR PROPERTY OF SETS OCCOGNOMINATION FOR PROPERTY OF SETS OCCOGNOMINATION FOR PROPERTY O		WHITNEY AIRCRAFT DIVISION	VEK	12/01/18	PAGE	SEKIAL
SUBRUUTINE CUEET (NOL)  PUNPOSE FUN EACH DRUPKET SIZE GROUP  C	CSG. FAN	157	10.0	11.33.02	10	021269
SUBRUUTINE CUEET (NO.)  PUNPOSE FUN EACH DRUPKET SIZE GROUP  C						
C PUMPOSE FUR EACH DRUPCET SIZE GROUP  C 1) EVALUATE MASS IMPINOEMENT KATE UN FIN SURFACE 00.002  C 2) SUMMATION SETS (UTAL MASS KATE UNTU FIN 00.004  A, AL, EPS, CUMP, FARME, ISTRA, MERTS JEZ, EL COMMUN ZUTHET, FRANTAL, JEZ, EL CUMMUN ZUTHET, FARMER JEZ, EL CUMMUN ZUTHET, FARMER JEZ, EL CUMMUN ZUTHET, MODIF,			E 33			
C						
C 21SUMARIJON SETS 1UTAL MASS KATE UNIU FIN 00004  LUMMUN /CINFI/FHM;FFSK,PS;TSK,FOCE, VAA,TA,XF,TAU,ALPHA;FAR 00005  A,XL,FFS,LUMPH;FARMB;ISTKM,REAT,TEXT, 00005  CUMMUN /CIPUT MUDTA,MUDTA,MUTFVO,DETAL,DZ,DL(5),B1(5), 00007  ATLF15J,MDTH,RAIPS;TTFEXE,DS;W, ETAFN  X,ULUISJ,BTE,DMDUT,BULGKIVD,UMUUT,Y,SL,FEYS,VAAO,FEYSO,FTAO 00008  A,STU,XTICCO,FEYSXT(10C),STI(10O),FTA(1CO),NSTEP,TAFFF 00010  CUMMUN /MISCX KNUMA,MUDCTFFT;LDL, FMMTMF,DTG,MM,TFO,DLF(5) 00011  X,DCTAC(5),FTAMUNTLI,TLL,MUDTFL(5),FARM,STDAM,FARE 00012  CUMMUN /KVSY CKYMUX(AM,1AKYMI(AM);LXY VAM(AM);LXY VAM						
CUMMUN /CINF1/FHW,PFSR,PS, IFSR, GFUEL, VA,TA,XF,TAU,ALPHA,FAR  A,XL,FYS,CUPH,FRAMD,ISTRM,MEAI,TEXI  COMMON /CIPTOT/ MUDILA,MUUT-,MUTEVG,DETAI,DZ,DL(5),B1(5), B1(5),  COUMDIA, XIPES,MUDILE,MUDILA,MUUT-,MUTEVG,DETAI,DZ,DL(5),B1(5), B1(5),  COUMDIA, XIPES,DMUDILA,MUUTUMUIT,VIST, CEPSYO,FTAO  A,DCUCI),B1ES,DMUDILA,DUCKTVU,UUUUIT,VIST,CEPSYO,FTAOFPSXO,FTAO  COMMON /MISC/ KNDA MUDICALDUCTFFI,DD, FINITMP,DIT,RMT,FTO,DLF(5)  COMMON /MISC/ KNDA MUDICALDUCTFFI,DD, FINITMP,DIT,RMT,FTO,DLF(5)  COMMON /CKVS/ CKVMUX(44),CKVKM(44),CKVKM(44),CKVKM(22),CKVFV(24)  A,DCKVSL(30),CKVPK(30), IKJP4(23),CKVTSL(20)  A,UKVSL(30),CKVPK(30), IKJP4(23),CKVTSL(20)  A,UKVSL(30),CKVPK(30), IKJP4(23),CKVTSL(20)  COUA  A,UKVPNICO,CKVPK(30), IKJP4(23),CKVTSL(10),CKVEVP(10),CKVTSP(10)  COUA  ACCUPATION OF A COURT			CFACE			
A,ALJEPS,LUPHJ-RARME,ISTRM-MEXI, [EXT OCCC CUMMUN /UTPUT/ MUDIT-MUDIT-MUTPVO, DETAI, B2;DL(5), B1(5), CCCC CUMMUN /UTPUT/ MUDIT-MUDIT-MUDIT-MUTPVO, DETAI, B2;DL(5), B1(5), CCCC CUMMUN /UTPUT, MUDIT-	75					
CUMMUN /UTPUT/ MUUTA, MUUTA, MUTTA, MUTTA, MUTTA, MUTTA, DETAIND 2, DL(5), B1(5), B1(5), MUTTA, PAI, TIARN 00008  X, DLC(5), B1E, DMDUT, BDLC, KIVD, DUDUT, Y, SLE, EYS', Y, XO, EYSXO, ETAO 00009  X, SIN, X1(1(C), EPSX1(1(C), SIL(1)0), ETA(1(G), NSIEP, TAEFF 00010  CUMMUN VINSOV, KHUA, MUA, ADUCT, PT, LDC, FHHI MP, DIT, XM, THO, DLF(5) 0011  X, DETAZ(5), ETAM, MUTTA, TLC, MUUTACT, FARM, STOAN, FARE 00012  CUMMUN VINSOV CKYMOA(44), CR VRIM(44), CR VLAM(22), CK VVV(24) 0013  X, CKYNSL(136), CK VPM(30), TRUP+1223), CKYTS(20) 00014  A, CKYNDT(126), CKYPT(26), CKYPTK(24), CKYSE(16), CKYVVP(16), CKYTSP(16), 00015  KEAL MUTTA, MUA, MUDTAT MUDTACT, MUUTACT, CLX, CKYSE(16), CKYVVP(16), CKYTSP(16), 00016  MCTTACT G. 00017  DU 1000 1 = 1, NDL 00017  DU 1000 1 = 1, NDL 00017  IFTJPUELE, B0, 1) KHUL = -027778 * TLF(1) * 50. 00019  IFTJPUELE, B0, 1) KHUL = -027778 * TLF(1) * 50. 00019  IFTJPUELE, B0, 1) KHUL = -027778 * THW * MUA) 00021  MEA = KHUA * VA * UL(1) / MUA 00021  MEA = KHUA * VA * TUL(1) / MUA 00021  LCS = 1. / KEA * (.8 * KEA0256 * REA**2 / 2 * .458E-05 * 00026  ENTARCA * 23515E-05 * REA**4 / 4 * * .4875E-U8 * REA**5 / 5 * 00026  ENTARCH * LLS 00027  X = .4602 * ALUG(8)4206  B01A2(1) = .61373 * .4845 * X106 * X**20637 * X**3 00027  X * (1.200653*LU) 00030  IFT(6ETAL(1) .6T. 1.0)BETAZ(1) = 1.0 00031  MUTTACT MUTTACT MUTTACT O0035  MUTTACT MUTTACT MUTTACT O0035  MUTTACT MUTTACT MUTTACT O0035  MUTTACT MUTTACT MUTTACT O0035			PHA, FAR			
ATLFLS; Multiple, Ri, PSI, TLPEX, BS; IW,  X, DLC(S); BLE, DMD(I; BLUCK; VO; BUDD(I); YSI, EPSS, V; XO; EPSXO; ETAO  X, STU; X, STIL(C); EPSXIT(O(); STILOO); LTA(1CO); NSTEP; TAEFF  OCOTO  CUMMUN VMISCV KHUA MUA PADUCT; PI; LDC, FHMTMP; DI; MM, THO; DLF(5)  A; DETAZ(S); ETAM; MULTIPLI; TLC, MULTIPL(S); FARM; STBAR; FARE  OVOIZ  CUMMUN VCKVSV CKYMOA(44); CR VRM(44); CR VLAM(22); CKVYV(24)  X; CKVSL (36); CKVPM(30); TRUP+(26); CKVSL(26)  A; CKVVLPT(26); CKVPT(126); CKVPT(126); CKVSLE(16); CKVEVP(16); CKVTSP(16); OCOTO  REAL MULTIPLE, MUA; MDUTTL  MULTIPLE, BUDD  OUTOOD  DUTOOD  TISTOPLE, BUDD  APRIME  DUTIPLE, BUDD  APRIME  DUTIPLE  APRIME  LUS  XREA**S / S SO/50* CCO * REA**E / Z. + . 458E-OS * CCOZS  XREA**S / S SO/50* CCO * REA**E / Z. + . 458E-OS * CCOZS  XREA**S / S SO/50* CCO * REA**E / Z. + . 458E-OS * CCOZS  XREA**S / S SO/50* CCO * REA**E / Z. + . 458E-OS * CCOZS  XREA**S / S SO/50* CCO * REA**E / Z. + . 458E-OS * CCOZS  XREA**S / S SO/50* CCO * REA**E / Z. + . 458E-OS * CCOZS  XREA**S / S SO/50* CCO * REA**E / Z. + . 458E-OS * CCOZS  XREA**S / S SO/50* CCO * REA**E / Z. + . 458E-OS * CCOZS  XREA**S / S SO/50* CCO * REA**E / Z. + . 458E-OS * CCOZS  XREA**S / S SO/50* CCO * REA**E / Z. + . 458E-OS * CCOZS  XREA**S / S SO/50* CCO * REA**E / Z. + . 458E-OS * CCOZS  XREA**S / S SO/50* CCO * REA**E / Z. + . 458E-OS * CCOZS  XREA**S / S SO/50* CCOZS  XREA**S / S SO/50* SCOZS  XREA**S /		가는 화가는 이번 경기를 하게 하다면 가게 되는 것 같아.				
X;ULU(5);ble; DMDUT; DUC; KIVD; DUDUT; Y; SL; EMS^, V, XO; EMSXO; ETAC  A; SIV; XI (15C); EMSXI (16C); SI (16O); SI (16O); SI EM; TAEFF  CUMMUN; VINSC, KNUA; MU; A; LUC, HUDUT; LUC; HIM IMM; DIT; MM, THO; DLF(5)  CUMMUN; CKVSC, CKVMUA(144; LKVKM(144); LRV LAM(122); CKVVV(24)  CUMMUN; CKVSC, CKVMUA(144; LKVKM(144); LRV LAM(122); CKVVV(24)  A; CKVSL (26); CKVPH (30); TKDP4(263); CKVTSL (26)  A; CKVSL (26); CKVPH (30); TKDP4(263); CKVTSL (26)  A; CKVSL (26); CKVPH (30); TKDP4(263); CKVTSL (26)  CO015  KEAL MUID; MUA; MUUTFL  MUUTFL (10; LLS)  OU017  OU017  OU 1006 1 = 1; NUL  IF(JPUEL; EU; L)  KEAL = 1; NHL =027778 * TLF(1) * 50.  OU019  IF(JPUEL; EU; L)  KEAL = KHUA * VA * UL(1) / MUA  OU020  KEA = KHUA * VA * UL(1) / MUA  OU021  DEPKIME = UL(1) * 2* VA * KHUL/(.75 * FHM * MUA)  LCS = 1: / KEA * (.8 * KEA0250 * KEA**2 / 2. * .455E=03 * .0022  CO22  XREA**3 / S3512=CO * KEA**4 / 4. * .9875E=U8 * KEA**9 / 5.)  OU024  BETAC(1) * .0373 * .4643 * X1076 * X**20637 * X**3  OU025  X * 1.4064 * X**4  DETAC(1) * EBIZ(1) * (.02+574); PUL(1)) * (.271*ALUG(ALPHA))  OU026  DETAC(1) * .053*IAU)  IF(ETAL(1) * .05**IAU)  IF(ETAL(1) * .05**IAU)  IF(ETAL(1) * .05**IAU)  OU035  MUTFC = MOTFC + MUUTFL(1)  OU035  OU036  CUNTINUE  KETUKN			(5),81(5)			
A,STO,XI(1CC),EPSXI(10C),SI(10O),ETA(1CG),NSTEP,TAEFF  CUMMUM /MISC/ KHUA:MOA;ADUCT,PI;EDG, FHNTMP;DIT,NN,TFO,DLF(5) OCC11  A;DCTAZ(5);ETAM;MDIFLI,TCL,MOUIFLED;FRAM;STOAN;FAKE OUG12  CUMMUM /CKVS/ CKVMUA(44);CKVM(44);CRVLAM(22);CKVPV(24) OCO13  A;CKVSL(3G);CKVPK(3O), TKJP41203);CKVTSL(20) OCO14  A;CKVPT(2G);CKVPTT(2G);CKVPTK(24);CKVSLE(10);CKVEVP(16);CKVTSP(10) OCO15  KEAL MUIFC,MUA;MDUTFL ,MUUIFL(10);ELS OCO16  METHC = G.U OCO17  DU 10GU 1 = 1;NUL OCC18  IF(JPUEL:EU,1) KHUL =027778 * TLF(1) + 50. OCC19  IF(JPUEL:EU,2) CALL UNBAK (CKVPT;1;TLF,O,J;KHUL;IS) OCO20  KEA = KHUA * VA * UL(1) / MUA OCC21  DYRIME = UL(1)**Z * VA * KHUL/(-75 * FHM * MUA) OCC21  DYRIME = UL(1)**Z * VA * KHUL/(-75 * FHM * MUA) OCC22  XREA**3 / S35/3E-C5 * KEA**4 / 4. * .485E-O3 * OCO23  XREA**3 / S35/3E-C5 * KEA**4 / 4. * .4875E-U8 * REA**5 / 5.) OCO25  X = .4762 * ALUG(B)4206 OCC25  X = .4762 * ALUG(B)4206 OCC26  DETAZ(1) = .0373 * .4843 * X10/6 * X**20037 * X**3 OCO27  A * .4064 * X**4  DETAZ(1) * EBIZZ(1)*(.6Z+57y-1*UL(1))*(.271*ALUG(ALPHA)) OCO29  X * (1.2U8093*IAU) OCO30  IF(BETAZ(1) * GT. 1.C)BETAZ(1) * TAU OCO33  MUTFC = MOTFC * MUUTFL(1) * OCO35  MUTFC = MOTFC * MUUTFL(1) * OCO35  106C CUNTINUE  KETUKN						
CUMMON /MISC/ KHUA; MUA; AUGUT; PI; LDC; FRMTMP; DIT; KM; TFO; DLF(5) 00012  A; DCTAZ(5); ETAM; MDIFL; TLC; MUDIFL(5); FAKM; STOAM; FAKE 00012  A; CKVSC (KVSV CKVMA(44+); CKV KMA(42+); CKV CMY(24) 00013  A; CKVST (SCYVKK) CA; CKVPK (SO); IKJP4(283); CKVTSL(20) 00014  A; CKVCPT(20); CKVPT(20); CKVPTK(2+); CKVSLE(10); CKVEVP(10); CKVTSP(10) 00016  MCTHC = 0.0 00017  DU 1000 I = 1; NUL  IFIJFUEL; EU:1) KHUL =027778 * TLF(1) + 50. 00019  IFIJFUEL; EU:1) KHUL =027778 * TLF(1) + 50. 00020  KEA = KHUA * VA * UL(1) / MUA 00021  EXAMPLE = UL(1) ************************************						
X_DETA2(5),ETAW_MOIFLI,TLL,MOUTPL(5),FAKW,STBAR,FAKE						
CUMMUN / CRVS/ CRVMUA(44,,CRVMM(44),CRVLMM(22),CRVPV(24)  X,CRVSL(36),CRVPM(30), IRJP4(23),CRVTSL(26)  A,CRVSL(36),CRVPM(36), IRJP4(23),CRVTSL(26)  A,CRVSL(36),CRVPM(36), IRJP4(23),CRVTSL(26)  CO016  A,CRVSTICA,CRVPM(36), IRJP4(23),CRVSL(16),CRVEVP(16),CRVTSP(16) 0C015  REAL MUIPC,MUA,MDUIPC			140, DLF 15			
X,UKVSL(36),CKVPK(30), IKJP4(283),UKVTSL(26)  A,UKVUPT(26),UKVPT(26),UKVPTK(24),UKVSLE(16),UKVEVP(16),UKVTSP(16) UC015  KEAL MUTPC,MUA,MDUTPC ,MUUTPC(10),LLS 00016  MCTPC = C.D 00017  DU 1000 I = 1,NUL 0C618  IPHJPUEL.EU.1)						
A;GRVUP1(26);GRVP1(26);GRVPIR(24);GRVSLe(16);GRVEVP(16);GRVTSP(16);OCO15 REAL MUIPC;MUA,MDUTPL ,MDUIFC(16);LLS 00016  MCTHC = G.0 00017  DU 1000 1 = 1;NDE 0CG18  JPIJPUEL.EU.1) RHUL =027778 * TLF(1) * 50. 0CG19  IPIJPUEL.EU.2) CALL UNBAR (GRVPT;1;TLF;0.0;RHUL;IS) 0C020  REA = RHUA * VA * UL(1) / MUA 00C21  DPRIME = UL(1);**2 * VA * RHUL/(.75 * PHW * MUA) 0C022  LLS = 1. / REA * (.8 * REA0256 * REA**2 / 2. * .458E-03 * 0C023  XREA**3 / 33515E-05 * REA**4 / 4. * .9875E-08 * REA**9 / 5.) 00024  B = DPRIME * LLS 0C025  X = .4762 * ALUG(B)4206  DETAZ(1) = .0373 * .4843 * X1076 * X**20637 * X**3 00027  A * .0469 * X**4 00026  DETAZ(1) = DETAZ(1)*(.62+579.1*DL(1))*(.271*ALUG(ALPHA)) 00026  DETAZ(1) = MDUTPL(1) * DLTAZ(1)* TAU 00032  MUTPC = MOTEC * MDUTPL(1) * DC035  106( CUNIINUE 00035			(4)			
REAL MUTPL, MUA, MDUTPL , MUUTPL(16), LLS 00016  MCTPC = 0.0 00017  DU 1000 1 = 1, NUL 00018  IP (JPUEL.EQ.1)	X ,	CKVSL (361,CKVPK (30), 1KJP4(283),CKVTSL(26)		00014		
METHC = 0.0  OU 1000 1 = 1,NUL  IFIJFUEL.EU.1) KHUL =027778 * TLF(1) + 50.  OC019  IFIJFUEL.EU.2) CALL UMBAK (CKVPT,1,TLF,0.0,KHUL,IS)  OC020  KEA = KHUA * VA * UL(1) / MUA  OFFIME = UL(1)**2 * VA * KHUL/(.75 * FHW * MUA)  OC022  LLS = 1. / KEA * (.8 * KEA0256 * REA**2 / 2. * .456E-03 * 00023  XREA**3 / 53575E-05 * KEA**4 / 4. * .9875E-U8 * REA**5 / 5.)  OC025  X = .4762 * ALUG(8)4266  OETAZ(1) = .0373 * .4263 * X1676 * X**20637 * X**3  OC026  DETAZ(1) = .0373 * .4263 * X1676 * X**20637 * X**3  OC027  A * .0469 * X**4  DETAZ(1) = BETAZ(1)*(.02+579.1*UL(1))*(.271*ALUG(ALPHA))  OC031  MDUTFL(1) = MUUTFL(1) * DETAZ(1)* TAU  OC033  MUTFL = MOTFL * MUUTFL(1)  OC034  KETUKN	A .	CKVCP1(26),CKVP1(26),CKVP1K(24),CKVSLE(16),CKVEVP(1	5) , LKVTSP	1161 00015		
DU 1000 I = 1,NUL  IF(JFUEL.EQ.1) RHUL =027778 * TLF(1) + 50.  OCO19  IF(JFUEL.EQ.2) CALL UNBAK (CKVPT,1;TLF,0.0;KHUL,1S)  OCO20  KEA = KHUA * VA * DL(1) / MUA  DPRIME = UL(1)***2 * VA * KHUL/(.75 * FHW * MUA)  OCO22  LLS = 1. / KEA * (.8 * KEA0256 * REA**2 / 2. * .456E-03 * 06023  XKEA**3 / 53575E-C5 * KEA**4 / 4. * .9875E-U8 * REA**5 / 5.)  OCO26  E = BPRIME * LLS  X = .4762 * ALUG(B)4266  DETAZ(1) = .0373 * .4843 * X1676 * X**20637 * X**3  OCO26  DETAZ(1) = bETAZ(1)*(.52+579.1*DL(1))*(.271*ALUG(ALPHA))  OCO26  DETAZ(1) = bETAZ(1)*(.52+579.1*DL(1))*(.271*ALUG(ALPHA))  OCO36  IF(BETAL(1) .GT. 1.C)BETAZ(1) = 1.0  MDUTFL(1) = MDUTFL(1) * BLTAZ(1)* TAU  OCO37  MUTFL = MOTFC + MDUTFL(1)  OCO36  1066 CUNTINUE  KETUKN  OCO37	K	CAL MUTTL, MUA, MUUTTL , MUUTTL(16), LLS		00010		
IFIJFUEL.EU.1) KHUL =027778 * TLF(1) + 50.  IFIJFUEL.EU.2) CALL UNBAK (CKVPT,1,TLF,0.0,KHUL,IS)  REA = KHUA * VA * UL(1) / MUA  DOC21  DPKIME = UL(1)**2 * VA * KHUL/(.75 * FHW * MUA)  CCC2  LLS = 1. / KEA * (.8 * KEA0256 * REA**2 / 2. + .456E-03 * 06023  XREA**3 / 33515E-05 * KEA**4 / 4. + .9875E-08 * REA**5 / 5.)  MEA = BPRIME * LLS  CCC5  X = .4162 * ALUG(B)4206  DETA2(1) = .6373 * .4643 * X1076 * X**20637 * X**3  CCC5  A + .0464 * X**4  DETA2(1) = DETA2(1)*(.62+579.1*UL(1))*(.271*ALUG(ALPHA))  OCC2  X * (1.200*.693*IAU)  IF(BETA2(1) = GT. 1.0)BETA2(1) = 1.0  MDUTFL(1) = MDUTFL(1) * BLTA2(1)* TAU  CCC3  MUTFL = MOTFL + MUUTFL(1)  OCC3  1000  10	M	D1+C = 0.0		00017		
IF(JFUEL.EQ.2) CALL UNBAK (CKVPT,1,TLF,0.0,KHUL,IS)  REA = KHUA * VA * DL(1) / MUA  OCC2  DPKIME = UL(1) * * * V * * KHUL/(.75 * FHW * MUA)  CCC2  LLS = 1. / KEA * (.8 * KEA0256 * KEA**2 / 2. * .456E-03 * CCO25  XREA**3 / 335/5E-C5 * KEA**4 / 4. * .98/5E-U8 * REA**5 / 5.)  OCC2  X = EPRIME * LLS  X = .4/62 * ALUG(8)4266  DETAZ(1) = .63/3 * .4263 * X16/6 * X**20637 * X**3  OCC2  A * .0469 * X**4  DETAZ(1) = bEIAZ(1)*(.62+579.1*DL(1))*(.271*ALUG(ALPHA))  OCC3  A * (1.2U8693*TAU)  IF(BETAL(1) - GT. 1.C)BETAZ(1) = 1.0  MUUTFL(1) = MUUTFL(1) * DETAZ(1)* TAU  OCC3  MUTFL = MOTFL + MUUTFL(1)  OCC3  OCC3  OCC4  OCC5  CCC6  OCC6  OCC6  OCC6  OCC6  OCC6  OCC6  OCC6  OCC6  OCC6  OCC7  A * .0469 * X**4  OCC6  OC	D	U 1000 1 = 1, NUL		00018		
REA = RHUA * VA * UL(1) / MUA 00021  DPRIME = UL(1)**2 * VA * KHUL/(.75 * FHW * MUA) 00022  LLS = 1. / REA * (.8 * REA0256 * REA**2 / 2. * .458E-03 * 00023  XREA**3 / 33575E-05 * REA**4 / 4. * .9875E-U8 * REA**5 / 3.) 00024  B = DPRIME * LLS 00025  X = .4762 * ALUG(8)4266 00026  EETAZ(1) = .6373 * .4843 * X1676 * X**20637 * X**3 00027  A + .0469 * X**4 00026  DETAZ(1) = DETAZ(1)*(.62+579.1*DL(1))*(.271*ALUG(ALPHA)) 00029  X * (1.20*693*TAU) 00030  IF(DETAZ(1) = ST. 1.C)BETAZ(1) = 1.0 00031  MDUTFL(1) = MDUTFL(1) * DETAZ(1)* TAU 00032  MDTFL = MOTFL + MDUTFL(1) 00033  1000 LUNIINUE 00035	1	FIJFUEL.EU.1) KMUL =027778 * 1LF(1) + 50.		00019		
DPRIME = UL(1)**2 * VA * KHUL/(.75 * FHW * MUA) 00022  LLS = 1. / KEA * (.8 * KEA0256 * REA**2 / 2. * .456E-03 * 00023  XKEA**3 / 55575E-C5 * KEA**4 / 4. * .9875E-U8 * REA**5 / 5.) 00024  B = DPRIME * LLS 00026  X = .4762 * ALUG(B)4266  DETAZ(1) = .0373 * .4863 * X1676 * X**20637 * X**3 00027  A * .0465 * X**4 00026  DETAZ(1) = DETAZ(1)*(.02+579.1*DL(1))*(.271*ALUG(ALPHA)) 00026  DETAZ(1) = DETAZ(1)*(.02+579.1*DL(1))*(.271*ALUG(ALPHA)) 00030  IF(BETAL(1) .GT. 1.C)BETAZ(1) = 1.0 00032  MUTFL(1) = MOTFL(1) * DLTAZ(1)* TAU 00032  MUTFL(2 = MOTFL + MUUTFL(1) 00033  1000 CUNTINUE 00035		r(JFUEL.EQ. 2) CALL UNBAK (CKVPT, 1, TLF, 0.0, KHUL, IS)		00020		
LLS = 1. / KEA * (.8 * KEA0256 * REA**2 / 2. * .458E-03 * 06023  XREA**3 / 33575E-05 * KEA**4 / 4. * .9875E-08 * REA**3 / 5.)  B = bPRIME * LLS  C = .4762 * ALUG(B)4266  BETAZ(1) = .6373 * .4843 * X1076 * X**20637 * X**3  O = .4764 * X**4  DETAZ(1) = bETAZ(1) * (.62+579.1*DL(1)) * (.271*ALUG(ALPHA))  A * .0469 * X**4  DETAZ(1) = bETAZ(1) * (.62+579.1*DL(1)) * (.271*ALUG(ALPHA))  IF (bETAZ(1) - GT - 1.07) bETAZ(1) = 1.0  MDUTFL(1) = MDUTFL(1) * bETAZ(1) * TAU  MUTFL(1) = MOTFL * MUUTFL(1)  O = .4762 * MUTFL(1) * MUTFL(1)  O = .4	K	EA = KHUA * VA * UL(1) / MUA		00021		
XREA**3 / 335/5E-C5 * REA**4 / 4. + .98/5E-U8 * REA**5 / 5.) 00024  B = BPRIME * LLS	ь	PRIME = UL(1)*+2 * VA * KHUL/(.75 * FHW * MUA)		00022		
# = EPRIME * LLS	L	LS = 1. / KEA * 1.8 * KEA0256 * REA**2 / 2.	+ .458E-0	3 * 00023		
X = .4/62 * ALUG(B)4200  DETAZ(I) = .0373 + .4843 * X10/6 * X**20637 * X**3  00027  A + .0469 * X**4  DETAZ(I) = BETAZ(I)*(.62+579.1*DL(I))*(.271*ALUG(ALPHA))  O0029  X * (1.208~.693*IAU)  IF(BETAL(I) .GT. 1.C)BETAZ(I) = 1.0  MDUTFL(I) = MDUTFL(I) * BLTAZ(I)* TAU  MUTFL = MOTFL + MDUTFL(I)  106( CUNTINUE  KETURN  00035	XK	EA##3 / 33515E-05 # KEA##4 / 4. + .9875E-08 #	KEA##5 /	5.1 00024		
### ##################################	8	= bPRIME * LLS		00025		
A + .0469 + X**4  DETAZ(1) = DETAZ(1)*(.6Z+D79.1*DL(1))*(.271*ALUG(ALPHA))  X * (1.2UB693*TAU)  IF(DETAZ(1) - 6T3. 1.C)BETAZ(1) = 1.0  MDUTFL(1) = MDUTFL(1) * DETAZ(1)* TAU  O0031  MUTFL = MDTFL + MDUTFL(1)  O0033  10CC CUNITNUE  KETUKN  O0035	X	= .4/62 + ALUGIB)4206		00026		
beTa2(1) = beTa2(1)*(.62+>79.1*DL(1))*(.271*ALUG(ALPHA)) 00029  X * (1.208~.693*TAU) 00030  Ir(beTa2(1) .6T. 1.C)beTa2(1) = 1.0 00031  MDUTFL(1) = MUUTFL(1) * bLTa2(1)* TAU 00032  MUTFL = MOTFL + MUUTFL(1) 00033  1004  KETUKN 00035	b	ETAZILI = .0373 + .4843 + X1076 + X**20637	* X**3	00027		
X * (1.208~.693*1AU)  Ir(BETAL(1) .GT. 1.C)BETA2(1) = 1.0  MDUTFL(1) = MDUTFL(1) * BLTA2(1)* TAU  MUTFL = MOTFL + MUUTFL(1)  10G( CUNTINUE  KETUKN  00035		+ .0409 + X**4		00028		
IF(BETAL(1) *GT. 1.C)BETA2(1) = 1.0 00031  MDUTFC(1) = MDUTFL(1) * BLTAZ(1) * TAU 00032  MUTFC = MOTFC + MUUTFC(1) 00033  1000 CUNTINUE 00035	ь	LTAZ(1) = BETAZ(1)*(.62+574.1*UL(1))*(.271*ALUG(ALP	(AH	00029		
MDUTFC(1) = MDUTFC(1) * BLTA2(1) * TAU 00032  MUTFC = MOTFC + MDUTFC(1) 00033  1000 CUNTINUE 00034  KETUKN 00035		* (1.208~.693*1AU)		00030		
MOTEC = MOTEC + MOUTEC(1) 00033 1000 CONTINUE 00034 KETUKN 00035	1	r(btTa_(1) .GT. 1.()btTa2(1) = 1.0		00031		
1000 CUNTINUE 00034 KETUKN 00035	M	DUTFL(1) = MUUTFL(1) * bLTA2(1)* TAU		00032		
KETUKN 00035	M	UTFC = MOTFC + MUUTFC(I)		00033		
KETUKN 00035						
	к	ETUKN				

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            DATA SET B28DCKVS AT LEVEL 001 AS UF 12/07/78 E33
C
      BLUCK DATA
                                                                                  00061
      CUMMUN /CRVS/ CKVMUA(44),CKVKM(44),CRVLAM(22),CKVPV(24)
                                                                                  00002
     X, CRVSL (36), CKVPK (30), TRJP4 (283), CKVT SL (26)
                                                                                  00003
     X,CRVCPT(20),CRVPT(20),CRVPTR(24),CRVSLE(10),CRVEVP(10),CRVTSP(10) GUOG4
      DIMENSIUN
                     TK11 1071, TR21901, TK3( 00)
      EUUIVALENCE (TRJP4(1),TK1(1)),(TRJP4(108),TR2(1)),(TRJP4(198),TR3(00006
     X111
                                                                                  00007
     ATT THE '/1.0, 1.6, 27.6, 9.0,.02,.300506-01,.350306-01 00008

A, .400006-01, .450006-01, .500506-01, .550006-01, .599906-01 00009

A, .025206-01, .050306-01, .075006-01, .700306-01, .724806-01 00010

A, .749606-01, .775206-01, .799606-01, .824906-01, .849760-01 00010
     x, .874600E-01, .899500E-01, .949700E-01, .999500E-01, .104970
                                                                , 260.000
     A, .109920
                    . .114956
                                 . . 114990, . 2 , 100.000
                                                                                  00013
                                    . 800.000
     X. 460.000
                                                                                  00014
                     . 600.000
                                                   . 1000.00
                                                                  . 1200.00
     X, 1-60.60, 1660.00, 1410., 1390., 1340., 1320.,1290.,1270.,1225.
X, 1210., 1190., 1973.6,1949.2, 1899.5
                                                                                  QUOIS
                                                                                  00016
                                  , 1765.48
     X, 1854.31
                   . 1606.09
                                                   . 1723.35
                                                                  , 1671.57
                                                                                  00017
     X, 1020.40
                     . 2244.67
                                    . 2210.24
                                                   . 2160.41
                                                                  . 2108.63
                                                                                  00018
                     . 2003.05
                                    . 1752.74
                                                                  . 1630.04
     X. 2056.35
                                                   . 1691.88
                                                                                  00019
                                                                  . 2291.37
     X, 4448.48
                     . 468.53
                                    . 2407.14
                                                   , 2350.25
                                                                                  00020
                                    . 2093.41
                                                                   . 2743.06
     A. 2426.90
                     , 2102.44
                                                   , 2010.78
                                                                                  00021
     x, 2707.11
                                    . 2571.67
                     . 2642.13
                                                   . 4504.06
                                                                  . 2428.43
                                                                                  00022
     A, 2349.75
                     . 2262.44
                                    , 2175.00
                                                   . 2974.62
                                                                  . 2931.98
                                                                                  00023
                     . 2175.64
     A. 2051.30
                                    , 2644.42
                                                   . 2605.58
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                     . 2301.52
                                    . 3178.17
     X. 2344.44
                                                   , 3135.02
                                                                  , 3044.07
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                     . 2050.25
                                                   , 2630.91
                                                                  , 2515.74
     X, 2952.28
                                    . 2742.13
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                     , 3348.22
     X. 2390.40
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        DATA THE /
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        2971.57
                                    . 4720.43
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                     , 3370.50
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     X, 3414.29
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     A. 2891.37
                     , 2705.44
                                    . 2030.04
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                     . 3302.54
                                    . 3176.17
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     X, 3423.86
                                                   . 2053.81
                                                                  . 2924.81
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                                                                  . 3400.41
     X. 2790.45
                                     , 2531.47
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                                                                                  00033
                                                                  . 2811.17
     A. 3335.53
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                                    . 3084.23
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     X, 2084.77
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                                                                  . 3355.84
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     A. 3228.93
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                                                   . 2835.03
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     A, 2565.44
                     , 3537.50
                                    , 3474.70
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                                                                                  00007
                     , 2977.61
                                    . 2840.19
     X. 3111.08
                                                                  , 2575.04
                                                                                  00038
                                                    . 2711.00
                                                                  . 3110.15
     A, 3516.64
                     , 3461.42
                                     3351.27
                                                    . 3235.03
                                                                                  06034
     X, 2980.20
                     , 2052.75
                                    . 2117.17
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                                                                  , 3480./1
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                                    . 3410.75
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     X. 3430.40
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     X, 2844.75
                     . 2719.29
                                    . 2564.20
                                                   , 3435.53
                                                                  . 3390.36
                                                                                  00042
     A, 3295.43
                     , 3109.00
                                     . 3678.68
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                                                                  . 2841.12
                                    , 3386.83
     A. 2712.09
                     , 2514.17
                                                   . 3341.12
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                                                                  , 2099.49
     X, 3154.31
                                                   . 2821.83
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     X, 2570.56
                     , 3337.00
                                    , 3246.06
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                                                                  . 3113.20 /
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        DATA TR3 /
                                                                                  00047
     x 3614.72
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                                                                  , 2050.65
                                                                                  00048
                                    . 3.51.87
     X, 3484.77
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                                                   , 3009.54
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                     . 2772.00
     A. 2875.13
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                                                                  . 3228.45
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     A. 3187.62
                     , 3166.60
                                     , 3621.32
                                                    , 2931.47
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     X. 2737.56
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      A, 3002.03
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      A. 2503.40
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     A, 6026.33
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      X, 2680.00
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      X; 2204.17
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                     , 2420.70 , 2333.61 , 2273.60 , 2193.91
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      A. 2511.08
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      A. 2113.26
                                                                                    900003
     X, 752., 7431, 500./
UATA CRVTSL / 1.,5.,11.,0.
                                                                                    06004
                                                                                    Guuos
      A, C., 1.5, 3.7, 7.5, 1C., 15., 2C., 3C., 40., 5C., 60.
                                                                                    00000
      4,0.,50.,108.,150.,173.,193.,209.,234.,255.5,274.,290./
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                                                                                    00069
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                                                                                    00010
                                                                                    000/1
      1, .021, .034, .640, .050, .655, .660, .000, .071
                                                                                    00012
      x, .075, .076, .082, .095, .100, .110, .115, .120

2, .00, .2, .4, .70, .905,1.115, 1.28,1.315

2, 1.32, 1.3, 1.27, 1.11, .76, .33, .14, 0.
                                                                                    040/3
                                                                                    00014
                                                                                    00075
       DATA CHYPK /1.6,5.0,13.,C.
                                                                                    00076
           0., 100., 200., 300., 400., 500., 600., 700.
      x, occ., 40C.,1000.,1100.,1200.
                                                                                    00018
      4, .710, .102, .046, .074, .071, .005, .000, .057
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      DATA CKYMUA / 1.0,3.0,20.,0.
                                                                                    06080
                                                                                    14009
           450., 500.,
                       560., 550.,
                                            600.,
                                                                                    00082
      ..
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                                                                                    00064
            1000.,
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      4,1.(91-15,1.161-05,1.261-05,1.351-05,1.431-65
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      4,1.51E-05,1.56E-05,1.66E-05,1.79E-05,1.92E-05
                                                                                    00007
      4,2.65e-65,2.18E-60,4.36E-65,2.42E-60,2.53E-65
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      4,2.64t-65,2.74t-05,2.84t-05,2.93t-65,3.02t-05
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       DATA CKVKM /1.0,3.6,26.,6.
                                                                                    00040
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                                                                                    OFFINE
                                                        1560.
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                                                            2000.
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      4,3.611E-60,3.97ZE-66,4.333Z-66,4.060E-06,5.000E-66
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      1,5.3Cot-Co,5.0116-U0,5.9176-00,0.5636-00,7.2226-00
      4,7.777E-(0,8.333E-00, E. 264E-06, 4.722E-06, 10.277E-06
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      2 .435, .460, .405, .510, .535, .560, .565, .615, .640, .665, .690/CC104
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LSG. FAN 751
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                      UATA SET BEBUERKUR AT LEVEL OCT AS UF 12/67/70
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                      UATA SET BEBUERKUR AT LEVEL 044 AS UF 03/15/78
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             SUBRUUTINE ENKUR 11.5161
                                                                                                                                                     GUCU2
             CUMMUN /PLUG/ TITLE, STITLE, NAMEI, NAMEZ, KI
                                                                                                                                                     00003
            COMMUN /AUGIN/ JEUEL, NAUGUP, NCUMUP, NESUP, NPKNIR, NPKNIF
                                                                                                                                                     00004
            CUMMUN / FLAMIN/ ALPHACIICCI, ALPHAN(100), FAC(100), FAN(100),
                                                                                                                                                     00000
           * TONITION, WEXTITION, XLUTTON, TEXTION, TEXTION, TONITION, TONITI
                                                                                                                                                     00008
                                                                                                                                                     00009
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                                                                                                                                                     00011
           * ZETM, ZEVC, ZEVM, TOURE, WOULL
                                                                                                                                                     00012
              CUMMUN / PHUUT/ PETAC, PETAH, PFAC, FFAH, FLI, FLK
NAMELIST / EUCT/ JFUEL, NAUGUP, NCUMUP, NFSUP, NPKNTK, NPRNTF, ALPHAC,
                                                                                                                                                     00013
                                                                                                                                                     00014
                                                                                                                                                     00015
           *ALPHAM, FAL, FAM, FHWL, FMWM, LSC, LSM, NSC, NSM, PFSK, TAUC, TAUM, TEXT,
                                                                                                                                                     00016
           * IFSK, I6C, TOM, WEXT, XLC, XLM, NTC, NTH, DFR, DPCS, UPU, DPM, DPMS, DPS,
           *EPSC, EPSH, ETA, ETAC, ETAH, FA, FAV, LA, LB, LC, LH, LT, LK, LZ, MOC, MOH, MOK
                                                                                                                                                     00011
                                                                                                                                                     000.0
           *PKNUZ, F50, T3n, ZEF, ZEFU, ZEFH, ZEFP, ZEFH, ZEFH, ZE TU, ZE IH, ZEVU, ZE VH,
           +TLUKE
                                                                                                                                                     00015
              KEAL LA, LB, LC, LM, LI, LK, LZ, MoL, Mon, Mok, LSL, LSM,
                                                                                                                                                     00020
           * NAMEL, NAMEZ, LCALC
UATA IFIRST / 0 /
                                                                                                                                                     00021
                                                                                                                                                     00022
               XLHV = 18656.
                                                                                                                                                     00023
               LUALU = Lb + AMAXI(LSU(1), LSH(1))
                                                                                                                                                     00024
               IF (SIG.LI.O.) WRITE (O,EGUT)
                                                                                                                                                     00025
               IF (JFULL.EL.2) XLHV = 10500.
                                                                                                                                                     00026
               1 F 1 K S 1 = 1
                                                                                                                                                     00027
               60 TO (16,46,661, 1
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      CHECK BLUCK NU. 5
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       10 IF (NCUMUP.LE.C.UK.NCUMUP.GT.3) WRITE (0,1022)
                                                                                                                                                     00000
               IF INCUMUP.LE.C.LK.NCUMUP.GT.31 STUP
                                                                                                                                                     00031
               14 (FAV.LT.C.) WELLE (0,1019)
                                                                                                                                                     00032
               1+ (+AV.67..Com) WKITE (0,1053)
                                                                                                                                                     00033
               IF (JFUEL.LE. U. UK. JFUEL. 61.2) WKITE (6,1023)
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               14 (MOL.LE.G.) WKI IE (0,1026)
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               IF (MOH.LE.C.) WKITE (0,1027)
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               IF (PSc.LE.U.) WKITE (c,1039)
                                                                                                                                                     00037
               1F (NCLMUP. LQ. 3) 60 TO 15
                                                                                                                                                     36000
      LHELK BLUCK NU. 1
                                                                                                                                                     UCO 34
               IF (LA.LT.Lb) WRITE (0,100))
                                                                                                                                                     00040
               IF (LL.LT.LZ) WRITE (6,100)
                                                                                                                                                     00041
               IF (NESUP-E4.2.AND.BPK.E4.C.) WRITE (6,1011)
                                                                                                                                                     01042
               IF (UPU-L1.0..UK.DPU-G1.1.) WRITE (6,1613)
                                                                                                                                                     00043
               IF (DPS.L1. G.. UK. DPS.GT. I.) WRITE (0,1010)
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               IF (BPK.L1.G.) WRITE (G,1018)
IF (NAUGUP-LE-C-UR-NAUGUP-GT-3) WRITE (6,1026)
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               IF (NFSUP.LE.U.UK.NFSUP.GT.21 WK17E (6,1021)
                                                                                                                                                     00047
                     (NPKNTK.LT.C.UK NPKNTK.GT.1) WKITE (6,1024)
                                                                                                                                                     00048
               IF (MOR.LE. 0.) WKI IE (0,1028)
                                                                                                                                                     00044
               IF (LA.LE.U.) WRITE (0,1031)
IF (LB.LE.C.) WRITE (0,1032)
IF (LC.LE.U.) WRITE (0,1033)
                                                                                                                                                     00050
                                                                                                                                                     60051
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        IF (LH.LE.O.) WRITE (0,1036)
                                                                                        00053
        IF (LZ.LT.O.) WKITE (6,163/)
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        IF (TCURE .LT.O.) WKITE (6,1038)
IF (PRNUZ.LE.1.) WKITE (6,1046)
                                                                                        00055
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        IF (NCUMUP.NE.Z) GU TU 18
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   15 1F (T3h.Gt.22GO.) WRITE (0,1C17)
1F (T3h.Lt.40G..AND.NTH.LE.G) WRITE (0,1G42)
1F (NPKNTF.LT.G.UR.NPKNTF.GT.1) WRITE (0,1G25)
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                                                                                        00061
        IF (WCUUL.LT.0.0.UK.WCUUL.GE.1.) WKI IE (6,1074)
                                                                                        66002
        IF INTL.LE.C.UK.NTC.GT.ICC) OU TO 20
                                                                                        00003
        00 25 L = 1.NTL
                                                                                        00004
        IF (ALPHACILI.LE.G..UK.ALPHALILI.GT. 180.) WKITE 16,1047)
        IF IFAUILI.LE.O. | WKITE (0,1051)
                                                                                        00000
        IF (FMMC(L).LE.G.) WRITE (6,1054)

IF (LSC(L).LE.G., UK.LSC(L).GE.LA) WRITE (6,1056)

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        IF (NSCIL).LT.C.UK.NSCIL).GT.100) WAITE (6,1000)
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IF (PFSK(L).LE.PSG) WAITE (0,1004)
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        IF (WEAT(L).6T.G..ANU.TEXT(L).LT.400.) WALLE (0,1007)
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   26 IF (NIH.LE.G.UK.NIH.GT.106) 60 TU 28
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        DU 27 K' = 1,NTH
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        IF LALPHAMIKI.LE. C.. UK. ALPHAMIKI.GT. 160. | WKITE 16,1048)
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        IF (FAM(K).LE.C.) WKITE (6,1002)
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        IF (FHAMIKI-LE.G.) WRITE (0,1055)
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        IF (LSM(K).LE.U..UK.LSM(K).GE.LA) WRITE (0,1057)
                                                                                        00005
        XMan = Mon/ (1. - ) AUH(K))
                                                                                        00006
        16 (XMCH. 67.1.) WKITE (6, 1759)
                                                                                        OUCO7
        IF (NSM(K).LT. U. UK. NSM(K). UT. 100) WRITE (6,1601)
                                                                                        66008
        IF (TAUMIK) .LE.U..UK.TAUMIK) .GE.1.) WELTE (0,1000)
                                                                                        00089
         IF (Tom(K).Lc.40(.) WKIE (6,1076)
                                                                                        00090
        IF (XLM(K).LE.G.) WKITE 10,1673)
                                                                                        00091
    47 CUNTINUE
                                                                                        60042
        IF (LPSC.LT.(...DK.EPSC.GT.1.) WRITE (0,1049)
IF (EPSH.LT.G...DK.EPSH.GT.1.) WRITE (0,1056)
IF (NTC.LT.G.OK.NTC.GT.10C) WRITE (0,1062)
                                                                                        00043
                                                                                        06674
                                                                                        06675
        IF (NTH.L1.C.UK.NTH.G1.100) WKITE (6,1063)
                                                                                        00046
        IF (NCUMUP.EU.3) KETUKN
                                                                                        00071
  THE IF INAUGUP. NE. 11 GU 10 19
                                                                                        00048
                                                                                        00099
        IF ( DPM.L 1.6 .. UK. DPM. 61.1.) WKITE (6,1014)
                                                                                        GUICE
        IF (NAUGUP. NE . 1) KETUKN
                                                                                        00101
        60 Tu 10
                                                                                        00102
  LHELK BLUCK NU. 3
                                                                                        CC103
   19 1F (NAUGUP.EU.3) GC TU 44
1F (ETA.L.I.G..UR.ETA.GI.1.) WRITE (6,1006)
                                                                                        00104
                                                                                        00165
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PRATT & WHITNLY AIRCRAFT DIVISION
                                                                                 12/61/18 PAGE
                                                                      VEK
                                                                                                              STRIAL
                                                                                 11.33.02
                                                                                                              Calcos
                                                                                                    46
        1F (FA.LT.O.) WKITE (0,1043)
                                                                                  00166
       IF (LK.GT.LE.ANU.NCUMUP.CW.1) WKITE (6,1002)
20
                                                                                  00107
       AF (L1.GE.LK) WRITE (0,10C4)
AF (L1.L1.C.) WRITE (0,1029)
                                                                                  00108
                                                                                  CULUS
        IF (LK.LE.C.) WKITE (6,1036)
                                                                                  00110
        IF (LA.LT.LCALC.AND.NCUMUR.EW.Z) WRITE (0,1003)
                                                                                  00111
        IF (UPn.L 1.0..UK.DPH.G [. 1. ) WKITE (6,1614)
                                                                                  00112
                                                                                  001.3
        IF ( IOCI I MALLE . C. ) WK. IE (0,1040)
        IF (10H(1).LE.C.) WKITE (0,1041)
                                                                                  00114
        IF (NAUGUP.EU.Z) KETUKN
                                                                                  00115
                                                                                  00116
C CHECK BLUCK NO. 4
   44 IF (UPUS.LT.C..UK.UPUS.Gf.I.) WKITE (6,1012)
                                                                                  66117
        IF (DPHS.LT.C..UK.DPHS.G[.1.) WKITE (6,1015)
        IF (ETA-LT. G. . UK . ETA . GT . I . ) WKITE (6 , 100 c)
                                                                                  00119
        IF (FA.LT.U.) WELTE (0,1043)
                                                                                  001.0
        IF (LK.61.LB.AND.NCUMUP.EW.1) WRITE (6,1002)
                                                                                  00121
        IF (LI.LT.C.) WKITE (6,1025)
                                                                                  00122
        IF (LK.LE.C.) WKITE (0,1036)
                                                                                  00123
        IF (100(11). LE. U. ) WKITE (6,1040)
                                                                                  00124
        1 (16H(1).LE.C.) WRITE (6,1641)
                                                                                  06125
       KETUKN
                                                                                  06120
C CHECK BLUCK NU. 7
                                                                                  UULE7
    76 IF INCUMUP. EU. Z) KETURN
                                                                                  00128
        IF (ETAL.LT.0..UK.ETAL.GI.L.) WKITE (0,1((7)
                                                                                  01129
                                                                                  66126
        IF (ETAH.LT.G..UK.ETAH.GT.I., WKITE 16,1666)
        IF ((FAC(1)+FAH(1)).EV.U.) WKITE (6,1009)
                                                                                  00151
        A = (FAV+(1.+FAV)*FAR(1))*(XLRV/1850(.)
                                                                                  OCISE
        Y = FAC(1) * XLHV/18500.
                                                                                  66133
        IF (X.GE..US.UK.Y.GE.. 09) WRITE (6,1010)
                                                                                  06134
        IF (LSU(1).LE.G..UR.LSU(1).UL.LA) WRITE (6,1034)
IF (LSH(1).LE.G..UR.LSH(1).UE.LA) WRITE (6,1035)
                                                                                  00135
                                                                                  0(156
        IF (166(1).LE.G.) WRITE (0,1646)
                                                                                  00137
        IF ( TOH( 1) . LE . O . ) WRITE (6, 1041)
                                                                                  00138
        IF (FAC(1).LT.O.) WRITE (6,1(44)
IF (FAH(1).LT.O.) WRITE (0,1045)
                                                                                  061 15
                                                                                  06140
        IF (LI.LT.O.) WRITE (6,1029)
IF (LK.LE.O.) WRITE (6,1030)
                                                                                  00141
                                                                                  0(142
        KETUKN
                                                                                  06143
   40 IF (LA.LT.LB) STUP
                                                                                  00144
        IF ILL.LT.LZ) STUP
                                                                                  00145
        IF (WCUUL.LT.G.O.GK.WCUUL.GE.1.0) STUP
                                                                                  06146
        IF IETA.LT.O..UK.ETA.GI.I. STUP
                                                                                  00147
        IF INFSUP.EU. 2. AND. BPK.EU. C. 1 STUP
                                                                                  00146
                                                                                  96144
        IF IUPCS. LT. O. . UK . UPCS . GT . I . I STUP
        IF (UPU.LT.O..UK.UPU.GT.I.) STUP
                                                                                  00150
        IF (UPH.LT.O..UK.DPH.GT.I.) STUP
IF (UPHS.LT.O..UK.DPHS.GF.1.) STUP
                                                                                  00151
                                                                                  00152
        IF IDPS.LT. G.. UK. UFS.GI.I. STUP
                                                                                  06153
        IF (BPK.LT.O.) STUP
        IF (FAV.LT.O..UK.FAV.GT.UCE) STUP
                                                                                  00155
        IF INCUMUP.NE. J. AND. NAUGUP. LE. C. UR. NAUGUP. GT. 31 STUP
                                                                                  00156
        IF INCUMUP. NE. 3. AND. NESUP. LE. U. UK. NESUP. GT. 21 STUP
                                                                                  00157
        IF (JFUEL .LE.O.UK.JFUEL.GT.Z) STUP
                                                                                  00158
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A STATE OF THE STA

F (NPNIN.LIT.G., UN., NPNIN.LIT.G.) STOP	PRATT & WHITNEY AIKCRAFT DIVISION CSG.PAN 757	VER 10.0	12/07/78 11.35.62	PAGE 23	SEKIAL 021269
	IF (NPHNIK-LI-G-UK-NPRNIK-GI-1) STOP		00159		
if thos.E.O.) STUP  1F (LALELO.) STUP  1F (LALELO.) STUP  1F (LCLELO.)					
F   LALE C.   SUP					
# (L2LL.0.) STUP  IF (TCURE.T.O.) STUP  OC169  IF (FALT.O.) STUP  OC170  IF (FALT.O.) STUP  OC171  OC171  OC171  IF (FALT.O.) STUP  OC172  IF (LL.G.L.R.) STUP  OC173  IF (LL.G.L.R.) STUP  OC173  IF (LL.G.L.R.) STUP  OC174  IF (LL.G.L.R.) STUP  OC175  IF (IL.G.L.R.) STUP  OC176  IF (INCOMP.P.L.Z.) RETURN  OC176  IF (INCOMP.P.L.Z.) RETURN  OC176  IF (INTC.LE.G.G.R.A.PHAU.(L).G.T.18G.) STUP  OC177  OC266 = INTC  OC178  IF (APPRAC(L).LE.G) STUP  OC181  IF (APPRAC(L).LE.G) STUP  OC182  AMOC = MOC.(L).T. STUP  OC183  IF (INCL.) L.T. C.C.N. STUP  OC184  IF (INCL.) L.T. C.C.N. STUP  OC185  IF (INCL.) L.T. C.C.N. STUP  OC186  IF (TAUC(L).LE.G) STUP  OC187  IF (INCL.) L.T. C.C.N. STUP  OC188  IF (INCL.) L.L. L.C. STUP  OC189  IF (INCL.) L.L. L.E. STUP  OC189  IF (INCL.) L.L. L. STUP  OC190  OC191  OC191  IF (MEXTLL) L.L. L. STUP  OC192  OC193  OC194  OC195  OC196  OC197  IF (MEXTLL) L.L. L. STUP  OC196  OC197  OC197  IF (MEXTLL) L.L. L. STUP  OC197  IF (MEXTLL) L.L. L. STUP  OC198  IF (INCL.) L.L. L. STUP  OC199  OC206  IF (INCL.) L.L. L. STUP  OC207  IF (MEMARK) L.L. L. L					
			// / / / / / / / / / / / / / / / / / /		
AF   MS.   STUP   CO.					
P					
SC					
Transference   Tran					
DU 25C L = 1,NTC  IF (ALPHAULL).LE.GUR.ALPHAULL).GT.18G.) STUP  O0179  O0179  O0179  O0179  O0179  O0179  O0179  O0179  O0179  O0180  O0181  IF (LSC(L).LE.G.) STUP  O0182  XMOC = MOC/(1TAUCLL)  IF (XMOL.GT.1.) STUP  O0183  O0184  IF (NS.(L).LT.GUK.NS.(L).GT.100) STUP  O0185  IF (TAUCL).LE.G.O.UK.FAUCL(L).GT.100) STUP  O0186  IF (TAUCL).LE.G.O.UK.FAUCL(L).GT.15UP  O0187  IF (XLC(L).LE.G.O.UK.FAUCL(L).GT.15UP  O0189  IF (XMC.GT.1.) STUP  O0190  IF (TFSK(L).LT.G.O.UK.FAUCL(L).LT.400.) STUP  O0190  IF (TFSK(L).LT.G.O.UK.FAUCL(L).LT.400.) STUP  O0191  O0192  CUNTINUE  O0193  O0194  O0195  IF (ALPHAMIK).LE.G.) STUP  O0196  IF (ALPHAMIK).LE.G.) STUP  O0196  IF (LSN(K).LE.G.O.K.SNIK).GE.LA) STUP  O0197  O0198  IF (LSN(K).LE.G.O.K.LSNIK).GE.LA) STUP  O0199  XMCH = MOH/(1TAUM(K))  IF (XMCH.GT.1.) STUP  O0200  IF (XMCH.GT.1.) STUP  O0201  IF (XMCH.GT.1.) STUP  O0202  IF (ISMIK).LE.G.O.K.LSNIK).GE.LA) STUP  O0203  IF (XMCH.GT.1.) STUP  O0204  IF (XMCH.GT.1.) STUP  O0205  IF (XMCH.GT.1.) STUP  O0206  IF (XMCH.GT.1.) STUP  O0206  IF (XMCH.GT.1.) STUP  O0206  IF (XMCH.GT.1.) STUP  O0206  IF (XMCH.GT.1.) STUP  O0207  IF (XMCH.GT.1.) STUP  O0207  IF (XMCH.GT.1.) STUP  O0206  IF (XMCH.GT.1.) STUP  O0207  IF (XMCH.GT.1.) STUP  O0207  IF (XMCH.GT.1.) STUP  O0207  IF (XMCH.GT.1.) STUP  O0209					
IF (LSC(L)-LE-CUK-LSC(L)-GE-LA) STUP  MOD = MOC/C(L)-TAUL(L)  IF (MOC.GT-L.) STUP  OC184  IF (NSC(L)-LT-CUK-NSC(L)-GT-100) STUP  OC185  IF (TAUL(L)-LE-OUK-TAUL(L)-GE-LA) STUP  OC186  IF (TAUL(L)-LE-C.) STUP  OC186  IF (PSK(L)-LE-PSO) STUP  OC197  IF (MEXT(L)-GT-CANU-TEXT(L)-LT-460.) STUP  OC197  IF (MEXT(L)-LT-O.) STUP  OC197  CUNTINUE  CUNTINUE  OU 27C K = 1,NIH  OU 27C N = 1,NI					
XMOC = MOC/(1TAUC(L))  IF (XMOC.GT.1.) STUP  IF (NSC(L).LT.C.UR.NSC(L).GT.100) STUP  OU185  IF (TAUC(L).LE.OUR.TAUC(L).GE.1.) STUP  OU185  IF (TAUC(L).LE.OUR.TAUC(L).GE.1.) STUP  OU186  IF (IDC(L).LE.40G.) STUP  OC186  IF (YESK(L).LE.PSO) STUP  OC196  IF (MEXT(L).GT.C.ANU.TEXT(L).LT.400.) STUP  OC197  OC197  OC197  OC198  OC199  AMEH = MOH/(1TAUNCK).GE.LA) STUP  OC199  AMEH = MOH/(1TAUNCK).GE.LA) STUP  OC199  AMEH = MOH/(1TAUNCK).GE.LA) STUP  OC200  IF (XMOC.GT.O.UR.NSH(R).GE.LA) STUP  OC201  IF (XMCK).LE.OUR.NSH(R).GE.LA) STUP  OC202  IF (XMCK).LE.OUR.NSH(R).GE.LA) STUP  OC203  IF (XMCK).LE.OUR.NSH(R).GE.LA) STUP  OC204  IF (XMCK).LE.OUR.NSH(R).GE.LA) STUP  OC205  OC206  IF (XMCK).LE.OUR.NSH(R).GE.LA) STUP  OC206  OC206  IF (XMCK).LE.OUR.NSH(R).GE.LA) STUP  OC207  IF (XMCK).LE.OUR.NSH(R).GE.LA) STUP  OC208  IF (XMCK).LE.OUR.NSH(R).GE.LA) STUP  OC209  OC206  OC207  IF (XMCK).LE.OUR.NSH(R).GE.LA) STUP  OC208  OC209  IF (NSH(R).LE.OUR.NSH(R).GE.LA) STUP  OC209  OC209  IF (NSH(R).LE.OUR.NSH(R).GE.LA) STUP  OC209					
1F (XMGL.GT.1.) STUP  1F (NS.(L).LT.C.UR.NS.(L).GT.100) STUP  1F (NS.(L).LT.C.UR.NS.(L).GE.1.) STUP  00160  1F (TAUC(L).LE.40G.) STUP  1F (XLC(L).LE.4.) STUP  1F (XLC(L).LE.4.) STUP  1F (YFSK(L).LE.FSO) STLP  1F (MEXT(L).LT.40G.) STUP  1F (1FSK(L).LT.40G.) STUP  25 (CUNTINUE  26 (L)					
IF (10c(1).LE.40c.) STUP  IF (XLC(1).LE.C.) STUP  OC186  IF (YFSK(1).LE.450) STUP  OC187  OC187  OC188  OC188  OC189  OC190  IF (YFSK(1).LT.400.) STUP  OC190  IF (YFSK(1).LT.400.) STUP  OC191  IF (WEAT(1).LT.400.) STUP  OC191  OC192  25C CUNTINUE  OC193  26C IF (NIM.LE.0.UR.NTH.GT.100) GU TU 280  OC194  OU 27C K = 1,NIH  OC195  IF (ALPHAMIK).LE.CUK.ALPHAMIK).GT.180.) STUP  OC196  IF (ALPHAMIK).LE.C) STUP  OC197  IF (HMMIK).LE.C) STUP  OC198  IF (LSn(K).LE.C) STUP  OC199  XMCH = M6H/11TAUM(K).  IF (XMCH.GT.1.) STUP  OC201  IF (XMCH.GT.1.) STUP  OC202  IF (IAUM(K).LE.0UK.TAUM(K).GE.1.) STUP  OC204  IF (IAUM(K).LE.0UK.TAUM(K).GE.1.) STUP  OC205  IF (IAUM(K).LE.0STUP  OC206  IF (XLC(K).LE.C) STUP  OC206  IF (XLC(K).LE.C) STUP  OC207  IF (XLC(K).LE.C) STUP  OC208  IF (ISH.(K).LE.C) STUP  OC206  OC207  IF (NPNTF.LI.G.UK.NPKNTF.GT.1) STUP  OC208  IF (ISH.LE.OANU.NPKNTF.GT.1) STUP  OC209					
IF (XLC(L).LE.C.) STUP  IF (PFSK(L).LE.PSO) STUP  IF (HEAT(L).CANU.TEXT(L).LT.400.) STUP  OC190  IF (TFSK(L).LT.400.) STUP  OC191  IF (MEAT(L).LT.400.) STUP  OC192  25C CUNTINUE  CUNTINUE  OC193  20L IF (Nin.LE.O.UR.NTH.GT.100) GU TU 280  OU 27C R = 1,NIH  OC195  IF (ALPHAH(R).LE.CUK.ALPHAH(R).GT.180.) STUP  OC196  IF (FAM(R).LE.C.) STUP  OC197  IF (FMM(R).LE.C.) STUP  OC198  IF (LSM(R).LE.C.) STUP  OC199  AMEH = MGH/(LTAUMIK)  IF (XMM.GT.L) STUP  OC201  IF (NSM(K).LT.O.UK.NSM(R).GT.100) STUP  OC202  IF (IAUM(K).LE.OUK.TAUMIK).GT.1100) STUP  OC203  IF (IAUM(K).LE.OUK.TAUMIK).GE.L.) STUP  OC204  IF (XMMC.GT.L) STUP  OC205  IF (XMMC.GT.L) STUP  OC206  IF (XMMC.LE.OUK.TAUMIK).GE.L.) STUP  OC207  IF (XMMC.LE.OUK.TAUMIK).GE.L.) STUP  OC206  IF (XMMC.LE.C.) STUP  OC207  IF (XMMC.LE.C.) STUP  OC206  OC207  IF (NSMT.LE.GANU.NTM.EU.U) STUP  OC209					
1F (WEXT(L).GT.CAND.TEXT(L).LT.460.) STUP 1F (TFSK(L).LT.460.) STUP 1F (TFSK(L).LT.460.) STUP 1F (WEXT(L).LT.40.) STUP 25C CUNTINUE 25C CUNTINUE 26C 1F (NTN.LE.0.UR.NTH.GT.1U0) GU TU 280 0C193  26U 1F (NTN.LE.0.UR.NTH.GT.1U0) GU TU 280 0C194 0U 27C K = 1,NIH 00195 1F (ALPHAH(K).LE.0) STUP 1F (FAH(K).LE.0) STUP 1F (FHHK).LE.0) STUP 1F (FHHK).LE.0) STUP 1F (LSn(K).LE.0) STUP 26C 1F (LSn(K).LE.0UK.LSn(K).GE.LA) STUP 27C 1F (NSh(K).LT.U.UK.NSh(K).GT.1CO) STUP 27C 1F (NSh(K).LT.U.UK.NSh(K).GT.1CO) STUP 27C 1F (XLH(K).LE.0UK.TAUH(K).GE.1.) STUP 27C 1F (XLH(K).LE.0) STUP 27C 1F (XLH(K).LE.0) STUP 27C 1F (NSh(K).LT.U.UK.NSH(K).GT.1CO) STUP 27C 1F (NSh(K).LT.U.UK.NSH(K).GT.1CO) STUP 27C 1F (NSh(K).LE.0) STUP 27C 1F (NSh(K).LE.0					
1F (TFSK(L).LT.460.) STUP 1F (WEXT(L).LT.0.) STUP 25C CUNTINUE 26L IF (NTH.LE.0.UR.NTH.GT.1U0) GU TU 280  00.194  00.27C K = 1,NIH 27C K = 1,N					
1F (WEXT(L).LT.O.) STUP  25C CUNTINUE  26U 1F (NTM.LE.O.UR.NTM.GT.1UO) GU TU 28O  DU 27C N = 1,NIH  1F (ALPMANIK).LE.OUK.ALPHANIK).GT.18O.) STUP  OU 176  OU 177  OU					
25C CUNTINUE 26U IF (NTM.LE.O.UR.NTM.GT.1UO) GU TU 28O					
200					
DU 27( K = 1,NIH  IF (ALPHAMIK).LE.CUK.ALPHAMIK).GT.180.) STUP  O0196  IF (IAPHAMIK).LE.C.) STUP  OC197  IF (IFMMIK).LE.C.) STUP  OC198  IF (LSn(K).LE.GUK.LSn(K).GE.LA) STUP  AMEH = M6H/11TAUMIK);  OC201  IF (AMEH.GT.1.) STUP  OC202  IF (IAUMIK).LE.CUK.NSH(K).GT.100) STUP  OC203  IF (IAUMIK).LE.GUK.TAUMIK).GE.T.) STUP  OC204  IF (XLH(K).LE.GUK.TAUMIK).GE.T.) STUP  OC205  270 CUNTINUE  280  IF (13H.GE.ZZOT.) STUP  OC206  IF (13H.GE.ZZOT.) STUP  OC208  IF (13H.LE.G.UK.MPKNTF.GT.1) STUP  OC209					
1F (ALPHAH(K).LE.GUK.ALPHAH(K).GT.180.) STUP 1F (FAH(K).LE.G.) STUP 1F (FHM)(K).LE.G.) STUP 1F (LSh(K).LE.G.) STUP 2F (LSh(K).LE.G.) STUP 2F (XMCH = MGH/11TAUH(K)) 2F (XMCH.GT.1.) STUP 2F (NSh(K).LT.G.UK.NSH(K).GT.100) STUP 2F (NSh(K).LT.G.UK.NSH(K).GT.100) STUP 2F (1AUH(K).LE.GUK.TAUH(K).GE.1.) STUP 2F (XLh(K).LE.G.) STUP 2F (XLh(K).LE.G.) STUP 2F (XLh(K).LE.G.) STUP 2F (XLh(K).LE.G.) STUP 2F (NSh(K).LE.G.) STUP 2F (NSh(K).LE.G.) STUP 2F (NSh(K).LE.G.) STUP 2F (NSh(K).LE.G.) STUP 3F (XLh(K).LE.G.) STUP 3F (XLh(K).LE					
1F (FAM(K).LE.G.) STUP 1F (FMM(K).LE.G.) STUP 0G198 1F (LSM(K).LE.GUK.LSM(K).GE.LA) STUP 0C199  XMCM = MGH/(1TAUM(K)) 1F (XMGM.GT.1.) STUP 1F (NSM(K).LT.G.UK.NSM(K).GT.1CO) STUP 1F (NSM(K).LT.G.UK.NSM(K).GT.1CO) STUP 1F (1AUM(K).LE.GUK.TAUM(K).GE.1.) STUP 1F (XLM(K).LE.GUK.TAUM(K).GE.1.) STUP 1F (XLM(K).LE.G.) STUP 1F (XLM(K).LE.G.) STUP 2F (LIBM.GE.ZOF.) STUP 2F (LIBM.GE.ZOF.) STUP 1F (NFNNTF.LT.G.UK.MFKNTF.GT.1) STUP 1F (NFNNTF.LT.G.UK.MFKNTF.GT.1) STUP 1F (NFNNTF.LT.G.UK.MFKNTF.GT.1) STUP 1F (NFNTF.LT.G.UK.MFKNTF.GT.1) STUP					
IF (LSn(K).LE.GOK.LSn(K).GE.LA) STUP  XMEH = M6H/(1TAUN(K))  IF (XMCH.GT.1.) STUP  OC271  IF (NSn(K).LT.O.UK.NSn(K).GT.1CO) STUP  OC202  IF (IAUN(K).LE.OUK.TAUN(K).GE.L.) STUP  OC203  IF (Tan(K).LE.460.) STUP  OC204  IF (XLn(K).LE.6.) STUP  OC205  270 CUNTINUE  OC206  28( IF (13H.GE.2207.) STUP  OC207  IF (NFNTF.LT.G.UK.NPKNTF.GT.1) STUP  OC208  IF (13H.LE.GANU.NTH.EU.O) STUP  OC209					
XMEH = M6H/(1TAUH(N))  1F (XMCH.GT.1.) STUP  1F (NSH(K).LT.U.UK.NSH(K).GT.1CO) STUP  1F (1AUH(K).LE.U.UK.NSH(K).GT.1CO) STUP  1F (1AUH(K).LE.U.UK.NSH(K).GE.1.) STUP  1F (XLH(K).LE.U.) STUP  27U CUNTINUE  28( 1F (13H.GE.2207.) STUP  1F (NFNTF.LT.G.UK.NFKNTF.GT.1) STUP  1F (13H.LE.UANU.NTH.EU.U) STUP  1F (13H.LE.UANU.NTH.EU.U) STUP  1F (13H.LE.UANU.NTH.EU.U) STUP  00205					
1F (XM6H.GT.1.) STUP 00202  1F (NSH(K).LT.U.UK.NSH(K).GT.1CO) STUP 00203  1F (1AUH(K).LE.U.UK.TAUH(K).GE.1.) STUP 00203  1F (TEH(K).LE.46U.) STUP 002C5  27U CUNTINUE 00206  26( 1F (13H.GE.2207.) STUP 002C7  1F (NFKNTF.LT.G.UK.MFKNTF.GT.1) STUP 002C8  1F (13H.LE.UANU.NTH.EU.U) STUP 002O9			The state of the s		
1F (NSH(K).LT.U.UK.NSH(K).GT.1CO) STUP 1F (1AUH(K).LE.U.UK.TAUH(K).GE.1.) STUP 1F (XLH(K).LE.46U.) STUP 1F (XLH(K).LE.U.) STUP 27U CUNTINUE 28C 1F (13H.GE.2207.) STUP 1F (NPKNTF.LT.G.UK.NPKNTF.GT.1) STUP 1F (13H.LE.U.ANDU.NPKNTF.GT.1) STUP 00208 1F (13H.LE.U.ANDU.NPKNTF.GT.1) STUP 00209					
1F (1AUH(K).LE.OUK.TAUH(K).GE.1.) STUP 00203 1F (TOH(K).LE.460.) STUP 00204 1F (XLH(K).LE.0.) STUP 00205 270 CUNTINUE 00206 26( IF (13H.GE.2207.) STUP 00207 1F (NFKNTF.LT.G.UK.MPKNTF.GT.1) STUP 00208 1F (13H.LE.OANU.NTH.EU.O) STUP 00209					
1F (Tom(K)-LE-460-) STUP 00205  1F (XLm(K)-LE-0-) STUP 00205  270 CUNTINUE 00206  28( IF (13m.GE-2207-) STUP 00207  1F (NFKNTF-LT-G-UK-MPKNTF-GT-1) STUP 00208  1F (13m.LE-0-ANU-NTm.EU-0) STUP 00209			A SECURITY CONTRACTOR OF THE PROPERTY OF THE P		
IF (XLH(K).LE.G.) STUP  270 CUNTINUE  28( IF (13H.GE.220'.) STUP  1F (NFKNTF.LT.G.UK.MFKNTF.GT.1) STUP  1F (13H.LE.GANU.NTH.EU.U) STUP  00208					
270 CUNTINUE 00206 280 IF (13H-GE-2200-) STUP 00207 IF (NPKNTF-LT-G-UK-NPKNTF-GT-1) STUP 00208 IF (13H-LE-G-AND-NTH-EU-U) STUP 00209					
28( IF (13H-GE-2207-) STUP 00207 IF (NPKNTF-LT-G-UK-NPKNTF-GT-1) STUP 00208 IF (13H-LE-G-AND-NTH-EU-O) STUP 00209					
1F (NPKNTF.LT.G.UK.NPKNTF.GT.1) STUP 00208 1F (13m.LE.GAND.NTm.EQ.G) STUP 00209					
1F (1:m.LE.UANU.NTm.EU.U) STUP 00209					
			The second secon		
IF (ETAM.LT.0UK.ETAM.GT.1.) STUP 00211					

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PRATT & WHITNEY ALKCHAFT ULVISION
                                                                  16.0
                                                                               12/07/78
                                                                                               PAGE
CSG . PANISI
                                                                               11.33.02
                                                                                                          021209
       1+ ((FAC(1)+FAH(1)).EQ.O.) STOP
                                                                               00212
       A = (FAV+(1.+FAV)*FAH(1))*(XLHV/1850C.)
                                                                               00213
       Y = FAC(1) * XLH V/18500.
                                                                               00214
       IF IX. UE . . CY. UK. Y. UE . . UY I STUP
                                                                               00215
       IF (LSC(1).LE.C..UK.LSC(1).GE.LA) STUP
                                                                               00216
       IF ILSHIIJALE.C. . UK. LSHIIJAGE . LAJ STUP
                                                                               06217
       IF INTULT, COUK . NIL. GT . 1601 STUP
                                                                               00218
       IF (NTH.LT.C.UK.NTH.GT.106) STUP
                                                                               00219
        IF TEPSC.LI.O..UR.EPSC.GI.1.) STUP
                                                                               00220
        IF (EFSH.LT.O..UK.EPSH.Gf.1.) STUP
                                                                               00221
       IF (NAUGUY- EU. 3) KETURN
                                                                               06222
       IF (16C(1).LE.C.) STOP
                                                                               00223
       IF ( 16H4 1) . LC . ( . ) STUP
                                                                               002.4
        IF (FAC(1).LT. C.) STUP
                                                                               00225
                                                                               00226
       IF (FAMILIALT. U.) STUP
       KETUKN
                                                                               00227
   60 IF (LA.LI.LCALL) LA = LCALL
                                                                               66278
       IFIRST = 0
                                                                               60224
       KEIUKN
                                                                               00230
 1001 FURMAT LIX, ****** INPUT ERROR NO. 1 - LA MUST DE GREATER THAN UN OCZOL
 *EQUAL TO LE ****** 1//)

1002 FURMAT (1x, ***** INPUT ERRUR NU. 2 - LE MUST DE GREATER THAN UK E00233
     *WUAL IL LK ***** ,//)
                                                                               00234
 1005 FURMAL LIX, ***** INPUT ERRUR NU. 3 - LA MUST DE GREATER THAN UK EOUZS
     *QUAL TU THE SUM UP LE PLUS THE MAX UF LSC UK LSH. 1,7, LA HAS BELNCEZSO +AUGUSTED AUGUNDINGLY. CHECK INPUT. ******,//)
                                                                               00237
 1004 FURMAL (11, ***** INPUT ERRUR NO. 4 - LE MUST BE LESS THAN LK
     **** ,//)
                                                                               00234
 1005 FURMAT (114, ****** INPUT ERRUR NU. 5 - LC MUST BE GREATER THAN UR ECC240
 *WUAL 10 L2 *******,//)
1006 FURMAT (14,***** INPUT ERRUR NU. 6 - ETA MUST BE BETWEEN 0. AND 100242
                                                                               00243
 ICC7 FURMAT (114, ***** INPUT EKKUK NU. 7 - ETAL MUST BE BETWEEN O. AND 00244
 1008 FURMA ( 114, ****** INFUT ERRUN NO. 8 - ETAM MUST BE BETWEEN O. AND GCZ+0
     *1. ****** .//1
                                                                               00247
 1069 FURMAT 114, ***** INPUT ERRUR NU. 9 - FAL AND FAH CAN NUT BUTH DE 00248
     +LEKE WITH AUGMENTUR UN +++++ 1//)
                                                                               00249
 1016 FURMAI IIX, ****** INPUT ERROR NO. 10 - CURE STREAM OR FAN TUTAL FUSICESO
     *EL AIR MATTU EXCEEDS LIMITS OF IDEAL TEMPERATURE KISE CORVE - 1,7/00251
 *1X,* BLUWUUI LIKELY ******,7/1 00252
1011 FURMA1 (14,***** INPUT ERKUR NU. 11 - BPK LAN NUT BE ZERU WHEN THUC253
     *E REMUTE FLUW SPEITTER UPTION IS SELECTED ***** ,//1
                                                                               00254
 1012 FURMAT (1X, ***** INPUT ERRUR NU. 12 - UPLS MUST BE BETWEEN G. ANDOC255
           +++++ 1,//)
                                                                               00256
 1013 FURMAI (1x, ****** INPUT ERKUR NO. 13 - UPU MUST BE BETWEEN G. AND 00257
     *1. ****** ,//)
                                                                               00258
 1014 FURMAT (14, ***** INPUT ERRUR NU. 14 - UPH MUST BE BETWEEN C. AND OCZOY
                                                                               06200
 1015 FURMAT TIA, ***** INPUT ERRUR NO. 15 - OPHS MUST BE BETWEEN C. ANDUZOL
 # 1. ####* 1//1 00202

1016 FURMAT (1x, ****** INPUT ERRUK NU. 16 - DPS MUST BE BETWEEN G. AND 00203
     41. ****** ,//1
                                                                               00204
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1017 FURMAT (1x, \*\*\*\*\* INPUT EKKUR NU. 17 - T3H EXCEEDS LIMITS OF IDEALOGZOS \* TEMPERATURE KISE CURVE. . , /, IX, T3H MUST BE LESS THAN 2200. DEG ROCZOO 00207 1016 FURMAT (1X, \*\*\*\*\* INPUT ERRUR NU. 18 - BPR MUST BE EQUAL TO UK GREGGZOB \*ATEK THAN 0. \*\*\*\*\* ,//) 1019 FURMAT (14, \*\*\*\*\* INPUT ERRUR NU. 19 - FAV MUST BE EQUAL TO UK GREGOZTO \*AIEK THAN 0. \*\*\*\*\* ,//) 00271 1020 FURMAT (1X, \*\* \*\*\* \*\* INPUT ERRUR NU. 20 - NAUGUP MUST BE 1, 2, UK 3 +00272 \*\*\*\*\*\*,//) 00273 1021 FURMAT (1x, \*\*\*\*\* INPUT ERRUR NU. 21 - NESOP MUST BE 1 UR 2 \*\*\*\*\*00274 90275 1022 FURMAT (1x, \*\*\*\*\*\* INPUT EKKUK NU. 22 - NCUMUP MUST BE 1, 2, UK 3 \*0C276 00277 1023 FURMAT (1x, \*\*\*\*\* INPUT ERKUR NU. 23 - JEUEL MUST BE 1 UK 2 \*\* \* \* \*\*0 02 78 00279 1024 FURMAI (1X, \*\*\*\*\* INPUT ERRUR NU. 24 - NPKNIK MUST BE O UR 1 \*\*\*\*00280 00281 \*\*\*\*06202 1025 FURMAI (14, \*\*\*\*\*\* INPUT ERRUR NU. 25 - NPRNTF MUST DE O UR 1 06263 1020 FURMAT (IX, \*\*\*\*\* INPUT ERRUR NU. 20 - MOL MUST BE GREATER THAN C 00284 +++++ 1//) 00285 1027 FURMAT (11x, \*\*\*\*\* INPUT ERRUR NU. 27 - MOH MUST BE GREATER THAN 0 00286 00267 1026 FURMAT (1x, \*\*\*\*\* INPUT ERRUR NU. 28 - MOR MUST BE GREATER THAN 0 00288 \*\*\*\*\*\* 1//) 00289 1025 FURMAT (1x, \*\*\*\*\* INPUT ERRUR NO. 25 - LI MUST DE EQUAL TO UK GREADOZEO +TCK THAN U. \*\*\*\* 00241 1030 FURMAT (1X, \*\*\*\*\*\* INPUT ERRUR NU. 30 - LK MUST BE GREATER THAN 0. 00292 00293 1031 FURMAT (14, \*\*\*\*\* INPUT ERRUR NU. 31 - LA MUST DE GREATER THAN C. 00274 00295 1032 FURMAT (1X, \*\*\*\*\* INPUT ERRUR NU. 32 - LB MUST DE GREATER THAN 0. 06296 \*\*\*\*\*\* ,//1 00247 1035 FURMAI (1X, \*\*\*\*\* INPUT ERRUK NU. 33 - LC MUST BE GREATER THAN 0. 00298 \* \*\*\*\*\* 1//) 00299 1034 FURMAT (12, \*\*\*\*\* INPUT ERRUR NO. 34 - LSC MUST BE GREATER THAN 0.00300 \* AND LESS THAN LA \*\*\*\*\* 1//) 00301 1035 FURMAT (1X, \*\*\*\*\*\* INPU: ERRUR NU. 35 - LSH MUST BE GREATER THAN 0.00302 \*\*\*\*\* \* ANU LESS THAN LA 00303 1036 FURMAT (1x, \*\*\*\*\* INPUT ERRUR NO. 36 - LH MUST BE GREATER THAN 0. 06304 +++++ 1,//1 00305 1037 FURMAT (1x, \*\*\*\*\* INPUT ERRUR NU. 37 - LZ MUST DE GREATER THAN UN GOSCO \*EQUAL TU U. \*\*\*\*\*\* JAPUT ERRUR NU. 38 - TOURE MUST BE EQUAL TO OR GOUSUS \*KEATER THAN G. \*\*\*\*\* ..// 00369 1039 FURMAI (11, \*\*\*\*\*\* INPUT EKKUK NU. 39 - PS6 MUST BE GREATER THAN 0.00310 \*\*\*\*\*\* ,//) 00311 1040 FURMAT (12. \*\*\*\*\* INPUT ERRUR NU. 40 - 160 MUST BE GREATER THAN 0.00312 \*\*\*\*\*\* 00315 1041 FURMAT (1x, \*\*\*\*\* INPUT ERRUR NU. 41 - TOH MUST BE GREATER THAN 0.00314 \*\*\*\*\*\* ,//1 003.5 1042 FURMAI (11, \*\*\*\*\* INPUT ERRUR NU. 42 - T3H MUST BE GREATER THAN 4000310 00317

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	1) & WHITNEY AIRCRAFT DIVISION .MAN757	VEK 16.0	12/01/78	PAGE 28	SEKIAL OZIZOY
C	UATA SET BEODFATMPE AT LEVEL OOF AS UP 12/07/76	E33			
	FUNCTION FATMPLIXI		00001		
	CUMMUN /TAB/ TAEL(COT, TABZ (44)		00002		
	CALL UNBAR (IABI,1,X,C.,FATMF,IS)		00003		
	FATMP1 = FATMP		00004		
	KETUKN		00005		
	END		00006		

	11 & WHIINEY AIRCKAFI DIVISIUN PAN757	VEK 16.0	12/07/76	PAGE 29	SERIAL 021269
C	CATA SET BÉBUFATMP2 AT LEVEL GOT AS OF 12/07/78 FUNCTION FATMP2(X)  CUMMON /TAB/ TAB1(80),TAB2(44)  CALL UNDAK (TAB2,1,X,0,,FATMP,15)  FATMP2 = FATMP  KETUKN	E33	00001 00002 00003 00004 00005		
	END		00006		

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PRATT & WHITNEY ALKCKAFT ULVISION
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                                                                                                                            VEK
                                                                                                                                                                               PAGE
                                                                                                                                                                                                    SCHIAL
                                                                                                                                                 11.33.02
                                                                                                                                                                                                    621204
                      DATA SET BEBUFHLUMB AT LEVEL OCT AS UF 12/07/78 E33
            SUBKOUTINE FHLUMB
                                                                                                                                                  60061
          CUMMUN /FNOUT/ FETAC, FETAH, FFAC, FFAH, FLB, FLT, FLK, FLSC, FLSH, * FTOC, FTOH, FZEFC, FZEFH, FZEFC, FZEFH, FZEFC, FZEFH, FZEFC, FZEF
                                                                                                                                                  00002
                                                                                                                                                   00003
                                                                                                                                                   00004
          * FLEVH
            CUMMUN /AUGIN/ JEUELI, NAUGUP, NCUMUP, NESUP, NPKNTK, NPKNLP
                                                                                                                                                  000005
           CUMMUN /FLAMIN/ ALPHAL(100), ALPHAH(100), FAL(100), FAH(100),
                                                                                                                                                  00006
          * FHWC(100), FHWH(100), LSC(100), LSH(100), NSC(100), NSH(100),
                                                                                                                                                  CCGOI
          * PESKI (100), TAUC (100), TAUH (100), TEXTI (100), FSKI (100), TOC (100),
                                                                                                                                                  CUCCO
          * Tom(100), WEXT1(100), XLC(100), ALM(100), NTC, NTM
                                                                                                                                                  00014
           CUMMUN/KMBLIN/BPR, DPCS, DPD, DPN, DPNS, DPS, EPSC, EPSN, ETAL, ETAC, ETAH, COC.O
          * FA, FAV, LA, LB, LL, LM, LI, LK, LZ, MOL, MON, MON, PKNUZ, PSC, T 3M, LEF, LEFL,
                                                                                                                                                  00012
          * ZEFH, ZEFP, ZEP, ZEPC, ZEPH, ZETC, ZETH, ZEVC, ZEVH, TCOKE, WCUUL
           KEAL MOUTA, MOUTE, MOTELO, MUTEVO, MOTEL1, MUTEC, MOUTEL
                                                                                                                                                  00013
          X,Kl,MCL,MCH,LSC,LSH,LI,LK,LC,LH
                                                                                                                                                  00014
         COMMON /CINPI/FHW, PFSK, PS, FFSK, JFUEL, VA, TA, XF, TAU, ALPHA, FAR
X, XL, EPS, CUFH, FARMU, ISTRM, WEXT, TCXT
                                                                                                                                                  00015
                                                                                                                                                  00010
           CUMMON /OTPUT/ MOOTA, MOUTE, MUTELC, MUTEVO, BETA1, BZ, DL (5), B1(5),
          XTLF(5),MDTFC,K1,PS1,TLFEX,B3,TW,
                                                                                 ETAFR
                                                                                                                                                   00018
          X, DLU(5), B1E, DMOTO, BUC, KİVD, DQDUTO, Y, SLU, EPSO, VU, XU, EPSXC, ETAC
                                                                                                                                                  00019
         X, STC, X1(10C), EPSX1(100), S11(100), ETA(10C), NSTEP, TAEFF
                                                                                                                                                  00026
           CUMMON /MISC/ KNUA, MUA, ADUCT, PI, LUC, FNW IMP, B11, KM, FFG, DLF(5)
                                                                                                                                                  00021
          X, DETAZ (5), ETAM, MDIFLL, TLC, MUUTFL(5), FARW, STOAK, FARE
                                                                                                                                                   00022
           CUMMUN /CKVS/ CKVMUA(44),CKVKM(44),CKVLAM(22),CKVPV(24)
          X, CKVSL (361, LKVPK (301, TKJP4 (2631, CKVT SL (261
                                                                                                                                                   CCC24
          X,CRVCP7(26),CRVP7(26),CRVP7R(24),CRVSLE(16),CRVEVP(16),CRVTSP(16) 00025
            DIMENSION CINPT(18), GTPUT(419), XMISC(29)
                                                                                                                                                  00026
           ENUIVALENCE (CINPICI) . FHW) . (UIPUT(1) . MULTA)
                                                                                                                                                  06027
          X. (XMISCILL . KHUA)
                                                                                                                                                  00028
           CUMMUN/SV/SAVIE(2), SAVIA(2), SAVUT(2), SAVFAK(2), SAVDTI(2),
                      SAVETALZI, SAVMUALZI, SAVMUFIZI, ZCVIZI, ZCPIZI, ZCTIZI,
                                                                                                                                                   00030
                      LUFAIZI, SAVVAIZI, TEXAVG, ETAAVG, XMDTAD, FARAVG, TAAVG, XMDTFU,
                                                                                                                                                  00001
                      TEXIT(100), STMDTA(100), SIMUTF(100), SITA(100), STVA(100),
                                                                                                                                                  00032
                      FARWK(100), ETAS(100), DTF1DL(100), ATK(100), ETAAVP, SAVLI(2), SAVLK(2), SAVLS(2), SLI(100), SLK(100), SLS(100), SVFAL(100)
                                                                                                                                                  000 33
                                                                                                                                                   000 34
                      FACAVG, TEXAVS, INIT (1001, SED(100), SAVXLB(2), 12(2)
                                                                                                                                                   00005
                                                                                                                                                   00000
            CALL GASTABI-1, DUMMY, DUMMY, DUMMY, DUMMY)
                                                                                                                                                  00037
            FARF = 1./(1. - WLULL * ((1. + BPK)/BPK))
                                                                                                                                                   00000
            00 2 1=1,100
                                                                                                                                                  00039
           SVFAC(1) = FAC(1)
FAC(1) = FAC(1) * FARE
                                                                                                                                                   00040
                                                                                                                                                   00041
                                                                                                                                                   00042
        2 CUNTINUE
                                                                                                                                                  00043
            IFIN = 0
                                                                                                                                                  00044
            1PS = 0
                                                                                                                                                   00045
            IPASS = 1
                                                                                                                                                   00046
                                                                                                                                                  00047
           NI = NIL
        1 DU 5 INUEX=1,NT
            INTILINUEX 1 = 0
                                                                                                                                                  00044
           K = 0
                                                                                                                                                  06650
            IF (INDEX. EL. NT ) IFIN = 1
                                                                                                                                                  OCG51
                                                                                                                                                  01052
            UU 10 1= 1.18
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PRATE & WHITNEY AIRCRAFT DIVISION
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                                                                                             12/07/78
                                                                                                                              SERIAL
                                                                                                                 PAGE
31
CSG.PAN757
                                                                                             11.33.02
                                                                                                                              021269
    10 CINPT(1) = 0.0
                                                                                              00053
   00 20 1= 1,419
20 01P0T(1) = 0.0
                                                                                              00054
                                                                                              00055
    DU 36 1= 1,29
30 xm15C(1) = 0.6
                                                                                              00056
                                                                                              00057
       ISTKM = ISTK
                                                                                              00058
        LALL SETUPIINDEX, 1PASS)
                                                                                              00059
       P1 = 3.14159

RMUA = 144. * P5 / (53.3*(7A466.))

ADUCT = FMW / TAU

MOUTA = KNUA * VA * ADUCT / 144.

MULIF = FAK * MUUTA
                                                                                              00000
                                                                                              00061
                                                                                              00002
                                                                                              00003
                                                                                              00064
        1F115TKM150,50,60
                                                                                              00005
    SC LALL INJECT (NDL, 1EK)
                                                                                              00066
       1F (1EK .6T. 6760 TO 1000

METHE = (1. - 817 ) * MOUTH

MOTEVC = 617 * MOUTH
                                                                                              00067
                                                                                              00000
                                                                                              00069
   00070
                                                                                              00071
                                                                                              00012
                                                                                              00073
                                                                                              00074
                                                                                              00075
                                                                                              000 16
        UMUTU = MOUTH - MUTFLI
                                                                                              00077
        CALL LULELTINULI
                                                                                              00076
        BZ = MUTFC / (MUTFLI#TAU)
                                                                                              00079
       LALL KELIKU
ICNT = 1
                                                                                              00000
                                                                                              00061
    00 /0 1 = 1.5
70 Det11 = Det11 / 3.200-00
                                                                                              06002
                                                                                              00083
        CALL' SEVETAIN)
                                                                                              00084
        IFIR .GT. OF INTICINDEX! = 1
                                                                                              60665
    60 CALL FLAME (JEK)
                                                                                              00086
                                                                                              00087
   b( CALL KECIKE
                                                                                              66668
                                                                                              00004
        Bo = 1.
                                                                                              00090
        LALL WAKEIN, DIFII
                                                                                              00091
       FARE - FAR + FARMO
                                                                                              00092
                                                                                              00043
     4 CALL RESULT(INDEX, IFIN, IPASS)

IF(IPS .EQ. C.AND. NPRNUP .EQ. 1) CALL PHPRT(INDEX)

IF(INDEX .EQ. NI .AND. NPRNUP .EQ. C .AND. IPS .EQ. C)
                                                                                              00044
                                                                                              00045
                                                                                              00000
       *LALL PHPKT (INDEX)
                                                                                              00097
     5 CUNTINUE
                                                                                              00046
       IPS = 1
                                                                                              06044
        IFITEIN .NE. 2160 TO I
                                                                                              06100
        NI = NTH
                                                                                              00161
        IF(1514 .61. 6160 TO 1660
                                                                                              00102
       15TK = 1
1P5 = 0
1F1N = 0
                                                                                              00103
                                                                                              00104
                                                                                              00165
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PRAIL & WHITNEY ALKCKAFT DIVISION	VEK	12/07/78	PAGE	SEKIAL
CSG. PAN757	10.0	11.33.02	32	021265
60 Tu 1		06166		
1000 IF INCOMOPINE 2) KETUKN		00107		
FLEFC = LCFA(1)		06108		
FLERM = LUFA(2)		00109		
FLEPC = ZCP(1)		00110		
rierm = (CP(Z)		00111		
FLEIC = LUTLI)		00112		
FZEIM = ZC1(Z)		00113		
FLEVE = LEVILLY		00114		
FLEVM = LLVILI		06115		
FLI=(SAVL1(1)+SAVMUA(1)+SAVL1(2)+SAVMUA(2))/(SA	VMUALI J+SAVMUA			
FLK=(SAVLK(1)+SAVMDA(1)+SAVLK(2)+SAVMDA(2))/(SA	VMCA(1)+SAVMUA	(2)) 00117		
FLSC = SAVXLS(1)		00118		
FLSH = SAVXLS(2)		60119		
FLB = (SAVXLB(1)*SAVMUA(1) + SAVXLB(2)*SAVMUA	(2))/(SAVMDA(1	+ 06120		
* SAVMENIZII		00121		
FETAL = SAVETA(1)		60122		
FETAM = SAVETALLI		06123		
FFAC = SAVFAK(1)		00124		
Fran = Savfan(2)		00125		
FTOL = SAVTA(1) + 400.		00126		
Flon = SAVIA(2) + 4cu.		00127		
C WKITE 10,999) FZEFC, FZEFM, FZEPC, FZEFM, FZETC, FZETM	, FLEVC, FLEVH,	06128		
C XFLI, FLK, FLSU, FLSH, FLB		00129		
C 999 FURMATT' LEFC LEFH LEPC LEPH	ZETC .	ZETH 00130		
C A ZEVC ZEVH LI LK L	C LHº/	06131		
C x,12+10.4,/, +Lb '/+10.4)		00132		
00 160 I = 1,100		00133		
100 FAC(1) = SVFAC(1)		00134		
KETURN		00135		
END		00136		

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PRATT & WHITNEY AIRCRAFT DIVISION
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                                                                                  12/07/18
                                                                                                   PAGE
                                                                                                              SEKIAL
CSG.PAN757
                                                                     10.0
                                                                                  11.33.02
                                                                                                              021269
            UATA SET BEBUFHPKT AT LEVEL OOL AS UF 12/07/76 E33
      SUBKUUTINE PHPKT(INUEX)
                                                                                  00001
       REAL LSHILSC , MOH, MOL, LA, LB, LC, LH, L1, LK, L2, MOR
                                                                                   00002
       DIMENSIUN FUELT (2)
                                                                                   00000
      CUMMUN /CTPUT/ MDUTA, MDUTF, MDTFLO, MDTFVO, BETA1, E2, DL(5), B1(5),
                                                                                   00004
     X1LF(5),MUTFC,K1,PS1,7LFEX,B3,1W, ETAFH
X,DLG(5),B1E,DMD1U,BUC,K1VU,DWDUTG,Y,SLU,EPS0,VG,X0,EPSX0,ETA0
                                                                                   00005
                                                                                   00000
     X,STG,X1(100),EPSX1(100),S11(100),ETA(100),NSTEP,TAEFF
                                                                                   00007
      CUMMUN /MISC/ RHUA, MUA, AUUCI, PI, LUC, FHWTMP, BIT, KM, TFO, DLF(5)
                                                                                  00006
      X, BETAZ (5), ETAW, MOTELL, TLC, MOUTELL 5), FAKW, STBAR, FAKE
      CUMMON /CRYS/ CRYMUA(44), CRYKM(44), CRYLAM(22), CKYPY(24)
                                                                                   00010
      X, CKVSL (301, CKVPK (301, TRJP4 1263), CKVT SL (26)
                                                                                   00011
      CUMMUN/SV/SAVTE(2), SAVIA(2), SAVDT(2), SAVFAR(2), SAVDTL(2), SAVETA(2), SAVDTL(2), SAVDTL(2), ZCT(2), ZCT(2),
                                                                                   00012
                                                                                   00013
            LCFA(2) , SAVVA(2), TEXAVG, E LAAVG, AMOTAD, FAKAVG, TAAVG, XMDTFD,
                                                                                  00014
            TEXIT(160), STMUTA(100), STMUTH(100), STIA(100), STVA(160),
                                                                                   00015
            FARMK(160), ETAS(100), UTFIUL(160), ATR(160), ETAAVP, SAVLI(2),
                                                                                   00016
            SAVLK (2), SAVXL5(2), SLI(100), SLK(100), SLS(100), SVFAC(100)
                                                                                   00017
      FACAVG, TEXAVS, 1WII(100), SLB(100), SAVXLB(2), 12(2)
CUMMUN /CINPT/FHW, PFSK, PS, TFSK, JFUEL, VA, TA, XF, TAU, ALPHA, FAK
                                                                                   00018
                                                                                   00014
     X, XL, EFS, CUFH, FARMB, ISTRM, WEAT, TEAT
                                                                                   00020
      CUMMUN /AUGIN/ JEUELI , NAUGUP , NCUMUP , NESUP , NPKNTK , NPKNUP
                                                                                   00021
      COMMON /FLAMIN/ ALPHACITOOI, ALPHANITOGI, FACTIOOI, FARTIOCI,
                                                                                   00023
      + rmwC(100),rmwH(100),LSC(100),LSH(100),NSC(100),NSH(100),
     * PFSK1(100), TAUC(100), TAUH(100), TEXT1(100), TEXT(100), TEXT(100),
                                                                                   00024
      * 16H(100), WEXTI(100), XLC(100), XLH(100), NTC, NTH
                                                                                   00025
      CUMMON/KMbLIN/bPR,DPCS,DPD,DPH,DPHS,DPS,EPSC,EPSH,ETAL,ETAC,ETAH, 00020
      * FA,FAV,LA,Lb,LL,LH,LL,LK,LZ,MOC,MOH, MOK, PKNOZ,PSO, T3H,ZEF,ZEFC,
                                                                                  00027
     * ZEFH, ZEFP, ZEP, ZEPC, ZEPH, ZETC, ZETH, ZEVC, ZEVH, TOUKE, WOUUL
      DATA FUELT /4H JP4, 4H JP5/
                                                                                   00029
                                                                                   00030
  161 FURMATTIHI, 474, *** CUMBUSTIUN MUDEL RESULTS ***)
                                                                                   00031
      1F (NPKNUP-1)10,100,100
                                                                                  00032
    IC 1F(15[KM)11,11,34
                                                                                  66633
   11 IF (INDEX .NE. NICIGO TO 9000
                                                                                   00034
      00 210 J = 1, NTC
                                                                                   00035
  210 IF (IWIII) .EU.1) WRITE (C, 140) J
140 FORMATI *** WARNING-----WAKE FEMPERATURE IFEKATION FAILED FUR
                                                                                   00036
                                                                                  00037
     ASTREAMTUBE NU. 1,131
                                                                                   00038
                                                                                   00009
      WKITE (6,101)
       WRITE(6,163)
                                                                                   00040
  103 FURMATI//61X, FAN STREAM')
                                                                                   00041
      WK1 (E (0, 102)
                                                                                   00042
  164 FURMAT (//624. * INPUT */)
                                                                                   00043
   15 WKITE (6.104)
                                                                                   00044
  164 FURMATISTA, STREAMTUBE NU. UF
                                             INLET INPUT
                                                                   EFFECTIVE F/H 00045
           BLUCKAGE MACH
                                                                                  60040
              SSA, TYPE
                                  THIS TYPE TEMP
                                                       F/A KATIU F/A KATIU WIU100047
     AN RATAU
                     NO.
                                                                                   00048
                                          DEG R D. LESS
                                                                 D. LESS
              57A .
                                                                              IN. 00049
          D' LESS D' LESS
                                   ./1
                                                                                   60050
   20 1 = 1 + 1
                                                                                   00051
       ToC(1) = T6C(1) + 400.
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      WK11E(6,105)1,NSC(1),T6C(1),SVFAC(1),FAK,FHWL(1),TAUL(1),MOL
                                                                           00053
  105 FURMAT (35x,14,7x,15,2x,+4.1,+4.4,1x,+4.4,1x,+9.4,+8.4,+4.4)
                                                                           00054
C 105 FURMAI (35X,16,5X,16,2X,FY.1,FIU.4,FY.4,1X,3FY.4)
                                                                           00055
      loc(1) = To((1) - 406.
                                                                           00056
      Irti .GE. NTC/GU TU 36
                                                                           00057
                                                                           00058
      WK1TE(6,106)
                                                                           00059
  106 FURMAI (1H1//61X, FAN STREAM (CUNT))
                                                                           00000
      60 TU 15
                                                                           00001
   36 SAVTA(1) = SAVTA(1) + 460.
                                                                           06062
      WK1TE(0,167) PS, SAVTA(1), SAVFAK(1)
                                                                           00003
  SAVTA(1) = SAVTA(1) - 400.
107 FURMAT(/40x, *STATIC PRESSURE(PSO)
                                                                           00004
00065
                                                                           00000
                                                                           00007
                                                                           00068
                                                                           00664
                                                                           00070
      WRITE(6,110)
                                                                           00071
  116 FURMAT( .H1//61X, 'UUTPUT')
                                                                           00072
      WRITE (0,103)
                                                                           00073
   55 WK1TE(6,111)
                                                                           06074
  111 FURMATIN 4CA, STREAMTUBE WARE FAA IDEAL TEMP CUMBUSTION EXIT . / GOOTS
              40x, Type KATIU KISE EFFICIENCY TEMP' / OCG / O
      1 = 0
   66 1 = 0 + 1
                                                                           00074
      TEXIT(1) = TEXIT(1) + 460.
                                                                           00086
      WKITE(6,112)1,FARWK(1),DTF1UL(1),ETAS(1),TEXIT(1)

FEXIT(1) = TEXIT(1) - 460.
                                                                           OCCBI
                                                                           00062
  112 FURMAT (/40x, 15, 1x, F11.4, 2x, F11.4, F8.4, 3x, F11.4)
                                                                           00003
      IF (1 .GE. NTC)GO TO 70
IF (1 .LT. 50)GO TO 60
                                                                           00084
      WKITE(6,106)
                                                                           06086
      GU TU 55
                                                                           00087
   76 SAVTE(1) = SAVTE(1) + 460.
                                                                           OUGHA
      WKITE(0,113) SAVUTI(1), SAVETA(1), SAVTE(1)
                                                                           00089
      SAVIE(1) = SAVIE(1) - 460.
                                                                           00090
                                            = ", F11.4, " DEG R " /
  113 FURMAT 1//41x , AVG TUEAL TEMP KISE
                                                                           00091
     X 41X, AVG THERMAL CUMB. EFF.
X 41X, AVG DULI EXII TEMPERAT
                                                                           00042
             41x, AVG DUCT EXIT TEMPERATURE = ",F11.4, DEG R ")
                                                                           00043
      60 TU 9000
                                                                           00044
   34 WRITE (6,108)
                                                                           00095
      WRITE(6,192)
                                                                           00096
  106 FURMAT(1H1, //6CX, CURE STREAM!)
                                                                           00047
                                                                           00098
      I = 0
   35 WKITE (6,1164)
                                                                           00044
 1104 FURMAT 135X, STREAMTUBE NU. UF INLET
                                                INPUT
                                                            F/H
                                                                    BLUCKA00100
                                                                          00161
            35A, TYPE
                              THIS TYPE TEMP
                                                  F/A RATIU WIDTH
                                                                    KAT1U 00102
     X
                                                                           00103
          STX.
                                      DEG R DILESS
                                                           IN.
                                                                   U**LESSOU104
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    40 1 = 1 + 1
(6H(1) = T6H(1) + 460.
                                                                                                                  00106
                                                                                                                  00107
                                                                                                                  00168
         wklTE(6,1105)1,NSH(1),T6H(1),FAH(1),FHWH(1),TAUH(1),M6H
 1165 FURMAT(354,14,7X,15,3X, F9.1, F8.4, 1X, F9.4, F8.4,1X, F9.4)
                                                                                                                  00109
         Ton(1) = Ton(1) - 460.

IF(1 .GE. NTH)GU TU 50

IF(1 .LT. 90) GU TU 46
                                                                                                                  00110
                                                                                                                  00111
                                                                                                                  00112
         WKITE (0,109)
                                                                                                                  00113
   109 FURMATILHI//60X, "CURE STREAM (CUNT)")
                                                                                                                  00114
                                                                                                                  00115
     50 SAVTA(2) = SAVTA(2) + 460.
                                                                                                                  00116
         WKITE 16, 11071PS, SAVTA 121, SAVFAR 121
                                                                                                                  00117
         SAVTAIZ) = SAVTAIZ) - 460.
                                                                                                                  00118
         1 = 0
                                                                                                                  00119
         #KITE ( 6, 110)
                                                                                                                  00120
     75 WKITE (0,111)
                                                                                                                  00121
    60 I = I + 1
TEXIT(I) = TEXIT(I) + 460.
                                                                                                                  00122
                                                                                                                  00123
         WRITE (6,112)1, FARWK(11, U1F1DL(11), ETAS(1), TEXIT(1)
TEXIT(1) = TEXIT(1) - 460.
                                                                                                                  00144
                                                                                                                  00125
         1F(1 .GE.NTH)GO TO 90
1F(1 .LT. 50)GO TO 80
WRITE(6,109)
                                                                                                                  00120
                                                                                                                  00127
                                                                                                                  00128
    GU TU 75
9C SAVTE(2) = SAVTE(2) + 460.
MRITE(6,113)SAVDTI(2),SAVETA(2),SAVTE(2)
                                                                                                                  00129
                                                                                                                  06130
                                                                                                                  00131
         SAVTE(2) = SAVTE(2) - 460.
                                                                                                                  00132
         60 10 9000
                                                                                                                  00133
   100 IF(151RM .GT. 0)GU TU 200
                                                                                                                  00134
   129 FURMAT (1H1)
                                                                                                                  00135
         WKITE(6,129)
                                                                                                                  00136
         IF(ISTKM .EU. O .AND. INDEX .EU. 1)WRITE(6,101)
                                                                                                                  06137
         WRITE(6,103)
                                                                                                                  00138
         WKITE (6, 114) INDEX, NSC (INDEX)
                                                                                                                  00139
   114 FURMAT 1//40x, STREAMTUBE TYPE
                                                                      = *,111/
         TA = TA + 460.
TEST = TEST + 460.
TAEFF = TAEFF + 400.
                                                                = ",111//
                                                                                                                  00141
        X
                                                                                                                  00142
                                                                                                                  00143
                                                                                                                  00144
                                                                                                                  00145
                                                                                                                  00146
          IF (IWTI(INDEX).EW.1) WRITE (6, 140) INDEX
       WRITE(6,115)PS,TA,MGC,SVFAL(INDEX),FAR,FHW,TAU,ALPHA,TFSR,
XPFSR,XF,XL,EPS,WEXT,TEXT,TAEFF,FUELT(JFUEL)
                                                                                                                  00148
                                                                                                                  001+9
  XPFSR, XF, XL, EPS, WEXT, TEXT, TAEFF, FUELT (JFUEL)

115 FURMAT (/40X, *STATIC PRESSURE (PSO) = *,F11.4,* PSIA *

40X, *APPRUACH TEMPERATURE (T6C) = *,F11.4,* D* LESS*

40X, *APPRUACH MACH NU. (M6C) = *,F11.4,* D* LESS*

40X, *INPU! F/A RATIU = *,F11.4,* D* LESS*

40X, *EFFECTIVE F/A RATIU = *,F11.4,* D* LESS*

40X, *F/H WIDTH (FHWC) = *,F11.4,* INCHES*
                                                                                                                  00150
                                                                                                                  00151
                                                                                                                  00152
                                                                                                                  00153
                      40X, 'EFFECTIVE P/A KATIU

40X, 'EFFECTIVE P/A KATIU

40X, 'EFFECTIVE P/A KATIU

5 ',Fil.4, 'D*LESS*

40X, 'BLUCKAGE RATIU(TAUC)

40X, 'F/H APEX ANGLE(ALPHAC)

40X, 'S/R FUEL TEMP(TFSR)

5 ',FIL.4, 'DEG R'
                                                                                                                  00154
                                                                                                                  00155
                                                                                                                  00156
                                                                                                                  00157
                                                                                                                  00158
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                 40x, "S/R FUEL PRESSURE(PFSK) = ",F11.4, PSIA "
                 46X, 5/K 10 F/M DISTANCE(LSC) = ",F11.4," INCHES"
46X, 16/M 10 NUZZLE DIST.(XLC) = ",F11.4," INCHES"
46X, 16/M 10 NUZZLE DIST.(XLC) = ",F11.4," NUMES"
46X, 16/M 10 NUZZLE DIST.(XLC) = ",F11.4," D" LESS"
46X, 16/M 10 NUZZLE DIST.(XLC) = ",F11.4," D" LESS"
                                                                                            00100
                                                                                            00161
                                                                                            00162
                                                                                            00163
                 40X, FLUW SOUNCE TEMP(TEXT) = ",F11.4," DEG R "
40X, FFFECTIVE INLET TEMP. = ",F11.4," DEG R "
                                                                                            00104
                  40X, "EFFECTIVE INLET TEMP.
                                                                                            00165
                  40X, FUEL TYPE
                                                        = 1,7X,A4
                                                                                            00166
       TA = TA - 460.
TFSK = TFSK - 400.
                                                                                            061.7
                                                                                            00168
       TEX1 = TEXT - 460.
                                                                                            00169
       TALFF= TAEFF - 460.
                                                                                            00170
       WK 176 (6, 126)
                                                                                            00171
  128 FURMAT (/63X, "UUTPUT")
                                                                                            00172
       WKITE(6,116)DLO(3),BIT
  110 FURMAT (/, 61x, 'INJECTION'/
                                                                                            00174
                                                      = ',F11.4,' MICRUNS'/
= ',F11.4,' D'LESS'/)
                40X, MEAN DROPLET SIZE
                                                                                            00175
                40X, FLASH VAPORIZATION
                                                                                            00176
       TH = TH + 460.
                                                                                            00177
       WRITE('0,117)BETAL, BZ, B3, K1, FARW, TW
                                                                                            00178
  117 FURMAT (54x , WAKE COMPUSITION SOLUTION 1/
                                                                                            00179
                40X, BETA 2
                                                       = ', +11.4, ' D''LESS'/
                                                                                            00180
                                                       = ',F11.4,' D''LESS'/
= ',F11.4,' D''LESS'/
                                                                                            00181
                40X, BETA 3
                                                                                            00182
                                                      = ',F11.4,' D''LESS'/
= ',F11.4,' D''LESS'/
                40x , 'K1
                                                                                            00183
                40X . WAKE F/A
                                                                                            00104
                40X , " WAKE TEMP
                                                       = ", +11.4, " DEG R ")
                                                                                            00185
       TW = TW - 460.
       WKITELO, 1181 SLO, EPSU
                                                                                            00187
  116 FURMAT (/57x, *FLAME SPREADING* /
x 40x, *INITIAL SPEED
x 40x, *INITIAL TURBULANCE
                                                                                            00168
                                                      = ',F11.4,' FP5 '/
= ',F11.4,' D''LESS')
                                                                                            00189
                                                                                            00190
       TEXIT (INDEX) = TEXIT(INDEX) + 460.
                                                                                            00141
       WKITE (6,119) DTF1DL(INDEX), ETAS(INDEX), ATR(INDEX), TEXIT(INDEX),
                                                                                            00142
      A STMDTA(INDEX), STMDTF (INDEX)
                                                                                            00193
  119 FORMAT (/55X, 'STREAMTUBE EFFICIENCY'/
                                                                                            00194
                 40X, IDEAL TEMP KISE
                                                        = ",Fi1.4," DEG R "/
                                                                                            00145
                                                        = *,+11.4
                 40X, COMBUSTION EFFICIENCY
                                                                                            00196
                  4UX, ACTUAL TEMP RISE
                                                        = ', F11.4, ' DEG R '/
                                                                                            00197
                 40X, FLUNKATE - AIR
                                                        = ',F11.4,' DEG R '/
= ',F11.4,' LBM/SEC'/
                                                                                            00196
                                                                                            00177
       40X, "FLOWRATE - FUEL
TEXIT(INDEX) = TEXIT(INDEX) - 400.
                                                       = ",F11.4," LBM/SEC")
                                                                                            00200
                                                                                            00201
       IFITHUEX .LT. NTCIGO TO 9000
                                                                                            00202
       WKITE(6,120)
                                                                                            00263
   126 FURMAT (1H1//57x, FAN STREAM SUMMARY 1/
                                                                                            00204
                  40x , STREAMTUBE FUEL-AIR MASS
                                                             COMBUSTION EXIT
                                                                                          1/00205
                  40x, TYPE KATIU FLUWRATE EFFICIENCY TEMP
                                                                                          .100200
                                                                                DEG R
                                                                                          ·1002C7
       DU 121 1=1,NTC
                                                                                            06208
       TEXIT(1) = TEXIT(1) + 400.
                                                                                            00209
        WRITE(6,122)1, SVFAC(1), STMUTA(1), ETAS(1), TEXIT(1)
                                                                                            00210
   121 1EXIT(1) = TEXIT(1) - 460.
                                                                                            00211
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    122 FURMAT (40X,14,2X,+11.4,+9.4,+9.4,2X,+11.4)
                                                                                                                                           00212
            TAAVG = TAAVG + 400.
TEXAVS = TEXAVS + 460.
TEXAVG = TEXAVG + 460.
                                                                                                                                           00213
                                                                                                                                          00214
                                                                                                                                          00215
           WRITE(6,123)WCOOL, ETAAVP, ETAAVG, TAAVG, TEXAVS, TEXAVG, XMDTAD, FACAVG, OOZL6
         XSAVDT1(1)
                                                                                                                                          00217
    123 FURMATI//4GX, "COULING FLUW/TUTAL ENGINE FLUW =",F11.4," D"LESS"/
                                                                                                                                          00218
                            40x, "CHEMICAL COMBUSTION EFFICIENCY =",F11.4," D"LESS"/ 00219
40x, "THERMAL COMBUSTION EFFICIENCY =",F11.4," D"LESS"/ 00220
                                                                                             =',F11.4,' DEG K '/ 00221
=',F11.4,' DEG K '/ 00222
=',F11.4,' DEG K '/ 00223
=',F11.4,' LBM/SEC'/ 00224
=',F11.4,' D*'LESS'/ 00225
=',F11.4,' DEG K 'J 00220
                            40x, AVG CUULING AIR TEMPERATURE
40x, AVG STREAMLINE EXIT TEMP
40x, AVG DUCT EXIT TEMPERATURE
                             46X, TUTAL FLUWRATE
                            +0x, AVG FUEL-AIR RAILU
+6x, AVG. IDEAL TEMPERATURE KISE
           TAAVG = TAAVG - 400.
TEXAVS = TEXAVS - 460.
TEXAVG = TEXAVG - 460.
                                                                                                                                           00227
                                                                                                                                          00228
                                                                                                                                           00229
           60 TO 9000
                                                                                                                                           00230
    260 WRITE 10, 1061
                                                                                                                                          00231
            WKITE (6, 114) INDEX, NSH (INDEX)
                                                                                                                                           00232
           TA = TA + 46G.
WKITE(6,124)PS,TA,MOH,FAK,FNW,ALPHA,TAU,XL,XF,EPS,FUELT(JFUEL)
                                                                                                                                           00233
                                                                                                                                          00234
    124 FURMAT(//40X, STATIC PRESSURE(PS6) = ',F11.4,' PSIA ' /
A 40X, APPRUACH TEMP(ToH) = ',F11.4,' DEG R ' /
X 40X, APPRUACH MACH NU. (MoH) = ',F11.4,' D'*LESS' /
                                                                                                                                           00235
                                                                                                                                          00236
                                                                                                                                          00237
                            +0X, FUEL AIR RATIULAN) = ', FI1.4, '0' LESS'
+CX, F/H WIDTH (FHWH) = ', FI1.4, 'INCHES'
                                                                                                                                          00238
                            4CX, F/H WIDITI(FHWH) = ",FI1.4," INCHES "
4CX, F/H APEX ANGLE(ALPHAH) = ",FI1.4," DEGREES"
                                                                                                                                          00239
                                                                                                                                          00240
                            46x, F/H APEX ANGLE(ALPHAM) = ',FII.4,' DEGREES'
46x, 'bLOCKAGE KATIU(TAUH) = ',FII.4,' D'*LESS'
46x, F/H TU NUZZLE DIST.(XLH) = ',FII.4,' INCHES'
46x, 'S/K TU F/H DISTANCELLS : ',FII.4,' INCHES'
46x, 'TURBULENCE LEVEL(EPSH) = ',FII.4,' D'*LESS'
40x, 'FUEL IYPE = ',7x,A4
                                                                                                                                          00241
                                                                                                                                          00242
                                                                                                                                          00243
                                                                                                                                           00244
                                                                                                                                           00245
                                - 460.
                                                                                                                                           00246
            TEXIT (INDEX) = TEXIT (INDEX) + 400.
                                                                                                                                           00247
            WRITE (6, 128)
                                                                                                                                           00248
            WRITE 16,1251K1, CTAN, SLU, EPSO, OTF IDL (INDEX), ETAFH, ATK (INDEX),
                                                                                                                                           00244
          A TEXIT (INDEX), MOGTA, MOUTE
                                                                                                                                           00250
           FURMATI//
                                                                                                                                           00251
                            46x, WAKE RECIRCULATION CUEF = ',FI1.4,' D''LESS'
46x, WAKE EFFICIENCY = ',FI1.4,' D''LESS'
40x, 'INITIAL FLAME SPEED = ',FI1.4,' FPS
                                                                                                                                           06252
                                                                                                                                          00253
                            +GX, 'INITIAL FLAME SPEED = ',FII.4,' FPS '
+GA, 'INITIAL TURDULENLE LEVEL= ',FII.4,' D*'LESS'
+GA, 'LUBAL TEMP RISE = ',FII.4,' DEG R '
+GX, 'ACTUAL TEMPERATURE RISE = ',FII.4,' DEG R '
+GX, 'EXIT TEMPERATURE RISE = ',FII.4,' DEG R '
+GX, 'FLUWRATE - AIR = ',FII.4,' LBM/SEC'
+GX, 'FLUWRATE - FUEL = ',FII.4,' LBM/SEC'
                                                                                                                                           00254
                                                                                                                                           00255
                                                                                                                                           06256
                                                                                                                                           00257
                                                                                                                                           00258
                                                                                                                                          00259
            40X.*FLUNRATE - AIK

40X.*FLUNRATE - FUEL

TEXIT (INDEX) = TEXIT (INDEX) - 400.
                                                                                                                                           00260
                                                                                                                                          00201
                                                                                                                                          OUZDE
           1F(100EX .NE. NTH)60 TO 9000 WRITE(6,126)
                                                                                                                                           00203
```

PRATT & WHITE	NEY ATRUKAFT DIVISION		VEK 10.6	12/07/78	PAGE 38	SERIAL 021269
120 FURMAT	(IHI//57X, CURE STREAM SUMMARY	//		00265		
λ	+Cx, STREAMTUBE FUEL-AIR MAS		EXIT	. / 00200		
X	+OX . TYPE KALLU FLU	WRATE EFFICIENCY	TEMP	1 00267		
*	4UX. D'ILESS LB	MISEL D'LESS	UEG	K. 1 00268		
DU 127	1=1,NTH			00269		
TEXIT	1) = TEXIT(1) + 400.			00270		
WKITE	E, 12211, FAH(1), STMU[A(1), ETAS(1	), TEXIT(1)		00271		
127 1EXIT	1) = [EXI](1) - 400.			00272		
1 an =	Tom + 460.			00273		
1 EXAVE	= TEXAVG + 40C.			00274		
MKITE	6, ISUJFAV, TSM, TEXAVO, ETAAVO, XMD	TAU, FARAVG, SAVALS	(2),	00275		
ASAVUTA	(4)			00276		
130 FURMAT	(//40x, M/B FUEL-AIR KATIU(FAV)	= *, + 11.4, * U* *LE	55.1	06277		
Α	4UA, "M/B INLET TEMP(ISH)	= ", +11.4, " DEG K	./	00278		
X	4CX, AVG EXIT TEMP	= ", +11.4, " DEG K	./	00279		
X	46x . AVG CUMB. EFFICIENCY	= *, +11.4, * 0 * Lt	55.1	00280		
X	4CX, TUTAL FLUWKATE	= ", F11.4, LBM/S	EC ./	06201		
*	40x, AVG FUEL-AIR RAILU	= *, F11.4, * D* *LE	55.1	00282		
	"GX, "AVE DISTANCE FRUM"/			00283		
X	40X , SPRAYBAR TU F/H	= ", +11.4, " INCHE	5 ./	00284		
X	40x, AVG. IDEAL TEMP. KISE	= ", +11.4, " DEG R	• ,	00285		
1 3H =	13H - 460.			00286		
TEXAVO	, = TEXAVG - 40C .			00287		
9000 RETURN				00200		
END				00289		

```
PRATT & WHITNEY AIRCRAFT DIVISION
                                                                                     12/07/78
                                                                        VEK
                                                                                                      PAGE
                                                                                                                  SEKIAL
CSG.PAN757
                                                                       10.0
                                                                                    11.33.02
                                                                                                                  021264
                                                                                                        34
             UATA SET 6280FLAME AT LEVEL GOL AS UF 12/07/78 E33
       SUBRUUTINE FLAME (IEK)
                                                                                     00001
C PUNPOSE
              EVALUATE TURBULENT PLAME RATE
                                                                                     00002
      CUMMON /CINPT/FHW, PFSK, PS, IFSK, JFUEL, VA, TA, AF, TAU, ALPHA, FAR
                                                                                     00003
     X,XL,EFS,CDFH,FARME,ISTRM,WEXT,YEXT
                                                                                      00004
       CUMMUN /UTPUT/ MDUTA, MDUTF, MDIFLO, MDFFVC, BETA1, b2, DL(5), B1(5),
                                                                                     00005
     XTLF(5),MDTFU,K1,PS1,TLFEX,B3,TW, ETAFA
A,DLU(5),B1E,DMDUT,BUC,KTVU,DWDUT,Y,SLU,EPSG,VU,XG,EPSXO,ETAO
X,STU,X1(10G),EPSX1(1CG),S(1(1DG),ETA(1GG),NSTEP,TAEFF
                                                                                     GUOUD
                                                                                     CCCOY
                                                                                     00006
       CUMMUN /MISC/ RHLA, MUA, AUUCT, PI, LDC, FHWTMP, DIT, KM, TFG, DLF (5)
                                                                                     00009
      X, DETAZ (5), ETAN, MOIFLI, TLC, MUUTFL(5), FAKW, STOAK, FAKE
                                                                                     06010
       COMMUN /CKVS/ CKVMUA(44),CKVKM(44),CKVLAM(22),CKVPV(24)
                                                                                     00011
      X, LKVSL (361, LKVPK (301, TKJP4 (2831, LKVT SL (26)
      X,CRVCPT(26),CRVPT(26),CKVPTK(24),CKVSLE(16),CKVEVP(16),CKVTSP(16) 00013
                                                                                     00014
       REAL LULIKI, MOUTEL
       1 CK = (
                                                                                     00015
       10 = 0
                                                                                      00016
       1 - (151KM . 61 . CIGL TU 40
                                                                                     00017
       PHI = FAR / .06/6
                                                                                      00018
       SUMUL = C.O
                                                                                     00014
       SUMMU = 0.0
                                                                                     00020
       00 1 1 = 1,5
                                                                                     00021
   SUMDL = SUMDL + DE(1) * MDUIFE(1)
1 SUMMD = SUMMD + MDUTFE(1)
                                                                                     00022
                                                                                     00023
       ULBAK = SUMDL / SUMMD
                                                                                     00024
     Pril = .767 - .525 * DLBAK +3.83E-04 * DLBAK**2 - 2.67E-06 * DLBAKD0025
      Ir(PHI .LT. PHIL) GO TO 80
SEPHI = SIN(PI/2.*(PHI-PHIL)/(1.-PHIL))
                                                                                     UUC.7
                                                                                     00028
       1F ( DL BAK-20 . 12, 2, 5
                                                                                     00029
     2 FUL = 1. + 1.23 * ULBAK / 2(.
                                                                                     00030
       60 10 4
                                                                                     00031
     3 FOL = 2.23 # 20. / ULBAK
                                                                                     00032
    4 SLL = 1.17 * FUL * SLPHI
CURVE IS THE SAME FUR JP4 AND JP5
                                                                                     06033
                                                                                     000 34
       LALL UNBAKICKVSL, I, FAK, C., SLG, ISI
                                                                                     06035
       SL = DETAL + SLG + (1. - DETAL) + SLL
                                                                                      00036
       60 10 50
                                                                                     00007
    LUNVE IS THE SAME FUR JP4 AND JP5
                                                                                     00038
    46 LALL UNDAK (CKVSL, I, FAKE, U., SL, IS)
                                                                                     00009
   50 SL - SL + 12.
                                                                                     00040
       PHIMS .NE. UJGU TU 997
PHIMS = FARMS / .COTE
AUZ = 3. * (1. - PHIMS) / (PHIMS + 14.3)
                                                                                     00041
                                                                                     00042
                                                                                     66.043
       1+(+5 - 14.715,0,6
     5 SL - SL * SWK[[PS/14.1] * (XUZ / .21) ** + ((TA+400.)/540.)**1.4
                                                                                     00045
       CU TU 7
                                                                                     000+6
     6 SL = SL # (XUZ/.Z1) ++ 5 + ((1A+400.)/540.) ++1.4
                                                                                     00047
     7 SL - SL + 63 + 61AW
                                                                                     00048
       V = 12. * VA / (1.- TAC)
SLU = SL / 12.
                                                                                     00044
                                                                                     00050
                                                                                     CCCSI
       AFT = 16. + FHW + 11. - IAU)/TAU
                                                                                     00652
```

PRATE & WHITNEY AIRCRAFT DIVISION CSG.PAN757	VEK 10.0	12/07/78	PAGE 40	SEKIAL CZ1209
EPS( = (.1667 * (LDFH * TAU + (TAU /(1TAU))**2)	.** 5	00053		
C1 = (XFT / ((1./EPS)**2 - (1./EPSO)**2))**.5	,	00054		
DAPRIM = (G1 / EPSO)**2		00655		
DX = 1.		00056		
ELAU = KI + LAU + LTAN		00057		
NSTEP= C		3000		
x0 = 6.6		00059		
X1(1)= .5 * FHW * LUC		00060		
YS = ETAG * FMW / (2. * TAU)		00061		
10 NSTEP = NSTEP + 1		00002		
EPSAG = G1 / SURTIXU + DXPKIM)		00063		
1F(A1(NSTEF) - AFT)11,12,12		00004		
11 EPSX1(NSTEP) = G1 / SURI(X1(NSTEP) + DXPKIM)		00005		
60 fu 13		00000		
12 EPSXI (NSTEP) = EPS		66067		
13 510 = 15L + SWKT14. * SL * EPSXO * VII+(1.+SIN	(P1*FTAG1)	0.0000		
STIINSTEP = (SL + SWKT(2. + SL + EPSX1(NSTEP) + V)) + (1				
SIBAK = .5*(SIC+SI1(NSTEP))		00070		
$\mu I = (\lambda 1(NSTEP) - \lambda 0) / V$		00071		
LY = SIBAK * DI		00072		
YS = YS + UY		00073		
ETAINSTEP) = 2. * YS * TAU / FMM		00014		
1+ (ETAINSTEP) - 1.120,998,998		00075		
20 1- (10)30,30,60		00076		
36 x0 = x1(NSTEP)		00077		
XIINSTEP+11 = XIINSTEP1 + UX		36078		
ETAG = ETAINSTEP)		CCCTY		
1F(X1(NETEP+1) - AL)1C+45+45		08300		
45 A1(NSTEF+1) = XL		06001		
14 = 4		00082		
66 10 1'		00003		
86 WATTE(6,163)		00064		
103 FURMAT (1H1, *-***** LVEKALL FUEL AIR KATTU BELUW	THE LEAN LIM	11 00065		
X*******		00006		
16K=1		00007		
60 10 999		00088		
997 WK11E(6,101)		00089		
101 FURMAT( FAR OUTSIDE FLAMABILITY LIMITS )		00000		
1ck = 1		0(071		
60 TO 999		00092		
998 LTAFH = 1.		00093		
16K = 1		00094		
60 10 999		00045		
66 ETAPH = ETAINSTEP)		06040		
X- = C.0		00097		
EPSKO = GI/SGKT(XC+DXPKIM)		00096		
510 = SL + SWKY (2. # SL * EPSXO * V)		00099		
999 RETURN		00100		
ENO		00101		

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PRATT & WHITNEY AIRCRAFT DIVISION
                                                                                                                                          12/07/78
                                                                                                                                                                       PAGE
                                                                                                                                                                                          SEKIAL
CSG.PAN757
                                                                                                                    10.0
                                                                                                                                          11.33.02
                                                                                                                                                                                          021264
                     DATA SET BEBUGASTAB AT LEVEL OCL AS UF 12/07/78
                    DATA SET GASTABNE AT LEVEL OCT AS UP OF UTC PROPRIETARY INFORMATION
                                                          AT LEVEL OC1 AS UF 09/12/75
                                                                                                                                           00001
C
                                                                                                                                           00002
             SUBRUUTINE GASTAD (1D1, AKG, FAULD, ANS, WAULD)
APRIL 14, 1972 REVISED TU LUMP CONSTANTS AND REDUCE CUMPUTER
                                                                                                                                           00003
                                                                                                                                           00004
               CALLULATION TIME WHERE PUSSIBLE
                                                                                                                                           00005
                                    THIS VERSIUM OF GASTAB USES CUBIC SPLINE FITS
                                                                                                                                           00006
                                    UF M AND PHI FUR AIR, STUICHIUMETRIC GAS, AND WATER
                                                                                                                                           00007
                                    DASED ON THE USE OF GASCAL/SPLNKK WITH HCK = .16
                                                                                                                                           80000
                                    ANU LHY = 18500.
                                                                                                                                           00009
                 ZMWAIR = MULECULAR WEIGHT OF AIR
C
                                                                                                                                           00010
                 HCK = HYDRUGEN/CARBON MASS KATIO
                                                                                                                                           00011
                 HUKM = HYDRUGEN/CARBUN MUL KATIU
                                                                                                                                           00012
                 ZMWF = MULECULAR WEIGHT OF FUEL
                                                                                                                                           00013
                 FA = FUEL/AIK MASS KATIU
                                                                                                                                           00014
                 FAM = FUEL/AIR MUL KATIU
                                                                                                                                           00015
                 FOZR = FUEL/UXYGEN MUL RATIO
                                                                                                                                           00016
                 WA = WATER/AIR MASS KATIU
WAM = WATER/AIR MUL RATIU
                                                                                                                                           00017
                                                                                                                                           00018
             DIMENSION IDI(13), GX(13), GTG(13), GPR(13), GKK(13)
                                                                                                                                           00019
             DIMENSION TITABLES
                                                                                                                                           00020
             CUMMUN/GASP/ HCK, HCKM, STUIC, STULHV, GHCK, GLHV
                                                                                                                                           00021
                                                                                                                                           00022
           DIMENSIUN
                                            AMSTUC(4/), BMSTUC(47), CMSTUC(47), UMSTUC(47),
                                            APSTUCIATI, BPSTUCIATI, CPSTUCIATI, UPSTUCIATI,
                                                                                                                                           00023
                                            AMAIK( 47), BHAIK( 47), CHAIK( 47), DHAIK( 47), APAIK( 47), BHAIK( 47), CHAIK( 47), DPAIK( 47), BHAIK( 47), BHAIK( 47), CHAIK( 47), DHAIK( 47), APAIK( 47), BHAIK( 47), CHAIK( 47), DPAIK(                                                                                                                                            000/4
                                                                                                                                           00025
                                                                                                                                           00026
     *** CUEFFICIENTS FUR AIR, WATER, AND STUTC. PRODUCTS- HCK = .10 CUB100028
C *** BASED UN 00,120 DEGREE CUBIC SPLINE FITS OF K AND K GAS CONSTITUENOUDZY
         WITH LAMBUA CUNDITIONS APPLIED AT FRONT END ***
CUEFFICIENTS OF STUICHIOMETRIC PRODUCTS OF HCR = .160 FUEL ***
                                                                                                                                           00030
                                                                                                                                           00031
                                                                                                                                           00032
             DATA AMSTUL /
             2.1162897E 3,
                                              2.5444999c 3, 2.9760543E 3, 3.4107199E 3,
                                                                                                                                           00033
                                     3,
                                              4.24630222
                                                                                                                                           00034
               3.8488099E
                                                                             4.7 3520 36t
                                                                                                            5.1835904E
                                                                     3,
               5.0000074E
                                              6.09121100
                                                                             6.5507523E
                                                                                                    3,
                                                                                                            7.4825092E
                                                                                                                                           00035
                                      3,
                                                                     3,
               8.431589BE
                                              7.3481749E
                                                                             1.0382321t
                                                                                                    4 ,
                                                                                                            1.13837516
                                                                                                                                           00016
               1.24015135
                                                                                                            1.5545543E
                                      4,
                                               1.34346006
                                                                     4.
                                                                             1.4463104E
                                                                                                    4 .
                                                                                                                                   4 ,
                                                                                                                                           04037
               1.662091ZE
                                      4 .
                                              1.77600401
                                                                                                            1.9913830E
                                                                                                                                           01036
                                                                     4.
                                                                             1.88058131
                                                                                                    4.
                                      4,
               2.10311.46
                                              2.2.57210L
                                                                                                            2.4433006E
                                                                                                                                           00039
                                                                             2.3291416E
                                                                                                                                           00046
               2.556.8276
                                               2.6 /30844E
                                                                             2.78978126
                                                                                                            2.40643166
               3.020c115E
                                              3.141c555t
                                                                                                            3.3776449E
                                                                                                                                           00041
                                                                             3.2543646E
                                               3.01014316
               3.47682776
                                                                             3.735014EE
                                                                                                    4,
                                                                                                            3.8558202E
                                                                                                                                           00042
               3.410.4431
                                      4,
                                              4.1,4011065
                                                                             4.2176868E
                                                                                                    4,
                                                                                                            4.33885546
                                                                                                                                   4.
                                                                                                                                           66.643
               4.40 CZ703E
                                              4.50194321
                                                                     4.
                                      4 .
                                                                             4.7636445E
                                                                                                                                           00044
             WATA BHSTUL /
                                                                                                                                           00045
               7.11655416
                                               7.16478636
                                                                             7.2.85247E
                                                                                                            7.2720890E
                                                                                                                                            00046
                                               1.30044/56
                                                                                                    0,
                7.3368972E
                                                                     0,
                                                                                                             7.5624035E
                                                                                                                                           00047
                                                                              7.4 430153L
                                                                                                                                   0,
                7.50307246
                                      u,
                                               7.6258316E
                                                                             7.693324CE
                                                                                                    C .
                                                                                                            7.8364526E
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                                      0 ,
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                                                                                                                                   0.
                7.981810/E
                                              8.12808125
                                                                             8.2741517E
                                                                                                            8.41458511
                                                                                                                                           00049
                                                                                                            8.9080610E
                                              0.074c433c U,
                                                                             8.79571096
                                                                                                                                   0,
               8.54764USE
                                                                                                                                           66656
                                      0.
                                                                                                    ũ,
               4.0122570t
                                      0.
                                               4.1040331E
                                                                             9.19172166
                                                                                                            4.2730624E
                                                                                                                                           00051
                                                                     U.
                                               9.419(200E' C.
                                                                                                    0,
               4.34848316
                                                                             4.4630010E
                                                                                                                                           00052
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PRATT & WHITNEY AIRCRAFT DIVISION CSG.PAN 757
                                                                             12/07/78
                                                                  VFK
                                                                                             PAGE
                                                                                                        SEKIAL
                                                                 10.0
                                                                             11.33.02
                                                                                                        021205
        9.5997939E
                          4.65041456
                                           9.6981817E
                                                            9.7436514E
                                                                              00053
                     0,
                                                                          0.
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        4.1841054E
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                                                             9.8945948E
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        4.4276441E
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                                       0.
                                                        0.
                          9.45602846
                                           9.9870892E
                                                            1.0014125E
                                                                         1,
                                                                              00055
        1.0049627E
                                           1.0086833E
                                                                              0.056
                          1.0064093E
                                                             1.0107985E
                     1.
                                                        1.
                                                                          1.
        1.0128644E
                          1.61494116
                                           1.0167232E 1/
                                                                              00057
                    1,
       CATA CHSTUC /
                                                                              00058
        4.1629745E
                                           4.0 £ 15520E -4,
                                                            4.9049840E -4,
                                                                              00059
                          4.93511296 -4,
        4.890370CE -4,
                                                            4.9153797E -4,
                          4.36199796 -4,
                                           5.0059803E -4,
                                                                              00000
        5.1127612t -4,
                                           5.9015815E -4,
                                                            6.0256059E -4,
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                                           6.07U6954E -4,
                                                                              00062
        0.0673095t -4.
                          6.1018397E -4.
                                                            5.6320912E -4.
        5.4260755E -4,
                          5.19022692 -4.
                                           4.8 452553E -4.
                                                            4.5283337E -4.
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        4.075e371t -4,
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                                           3.6577123t -4,
                                                            3.1223749E -4,
                                                                              00064
                          2.7175533L -4,
                                           2.6 137090E -4,
                                                             2.4993279t -4,
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                          2.09861006 -4,
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                                                            1.40655171 -4,
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                          1.0783451E -4,
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                                                            1.3540700t -4,
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                          4.0203445E -5.
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        1.09599191 -4.
                                                                              60069
         4.5431233E -5,
                          7.71246646 -5,
                                           7.1385709E -5/
                                                                              00010
       UATA UNSTUC /
                                                                              00071
        4.6263240E -7,
                        -5.0785723E -7,
                                           4.9079559E -7, -4.7822750E -9,
                                                                              000 72
       -2.9067600t -7,
                        3.9110132t -7,
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        1.3019743E -7,
                         3.0863274E -7,
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                                          3.4506690E -8, 1.7101044E -8, -1.2183454E -7, -5.7059921E -8,
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        4.0194581E -4, -8.6511271E -4,
                                                                              01015
       -6.5686099E -8, -8.1936581E -8, -1.0192268E -7, -1.2019293E -7,
                                                                              00076
       -1.37//01CE -7, 1.0129703E -8, -1.4870484E -7, 1.0733906E -0,
                                                                              000 17
       -1.2318441E -7, -2.8845605E -8, -3.1772563E -8,
                                                           -1.0526642E -7,
                                                                              00078
       -6.2107655E -4,
                        -5.983920ZE -8,
                                           6.6563526E -9,
                                                           -1.0701486E -7,
                                                                              00014
        4.3024122t -8,
                        -6.0824870L -8,
                                          -2.4246541E -8.
                                                           -1.0057489E -9,
                                                                              00000
                        -1.12823361 -8, -3.5576490E -8,
2.1338711t -8, -6.6174755t -8,
       -3.3133402c -8.
                                                                              C0001
                                                            5.4746372E -8.
       -5.3876911E -8.
                                                                              00002
       -5.2240412E -8,
                        -1.5941373t -0, -3.0464246c-16/
                                                                              00083
       DATA APSTUC /
                                                                              00004
        4.2025682E
                                                                              00005
                                           4.4445534E
                                                            4.5462856E
        4.63226126
                          4.7697716E
                                           4.7804433t
                                                            4.8454541t 1,
                                                                              00000
                                                                         1.
        4.4057502F
                     1,
                          4.4020247E
                                       1.
                                           5.0149295E
                                                             5.1120700E
                                                                              000E7
        5.1999543E
                                                             5.42487145
                                                                              00088
                          5.280650ZE
                                           5.3552404E
                                                        1.
                                                                         1.
                                       1 .
                                                                              00089
         5.4400463E
                                           5.60990596
                                                             5.6652565E
                     1.
                          5.55164871
                                       1.
                                                        1.
                                                                          1.
                                                        1,
         5.7180544E
                          5.708 33050
                                           5.8165660E
                                                             5.8627804E
                                                                              00090
                                       1,
         5.9070800E
                          5.949 1975E
                                           5.9909137E
                                                             6.0305880E
                                                                              00091
                      1.
                          6.10589046
                                           6.1416051E
                                                                         1,
         6.06884/3E
                                                            6.1765432E
                                                                              00092
                                                                         1,
        6.2101202E
                          6.2426534E
                                           6.2746705E
                                                             6.3055383E
                                                                              06093
                                                                              00094
        6.3355689F
                     1.
                          0.364E438E
                                       1.
                                           6.3933666E
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                                                            6.421/032F
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                                                           1,
                                                               5.3607449+
                                                                                 00244
                           5.5.26000E
                                             5.56639996
                                                               5.65139796
         5.43344446
                      1,
                                         1.
                                                           1.
                                                                             1.
                                                                                  00245
         5.7116999E
                           5.7700999E
                                             5.8 4 610COE
                                                                                  00246
                                                               5.8003000E
                                                           1.
         5.4320000E
                      1,
                           5.4136444
                                             6.0327774E
                                                                6.0808999
                                                                                  00247
                      1.
         0-1274030F
                           0.1/204441
                                             6.21609994
                                                               6.2596999E
                                                                                 06246
         6.36 150666
                      1.
                           6.3423000E
                                             6.36209996
                                                               6.42099986
                                                                             1.
                                                                                 00244
                                                           1 ,
         6.4596999
                      1.
                           6.44614446
                                             6.5 3244 79E
                                                               6.567 44446
                                         1.
                                                           1 .
                                                                             1.
                                                                                 CC250
         0.0020000E
                           0.63619996
                                             0.6 700944E
                                                               6.7627999E
                                                                                 00251
                                         10
                                                                             1.
         0.7347999E
                           6.7661999E
                                             6.7468999
                                                                                  06252
        UATA BPHZU
                                                                                  00253
                                             1.89688556 -2,
         2.6 JEUUU1E -2,
                           2.2131765E -2,
                                                               1.00307746 -21
                                                                                  00234
         1.48340,51 -2.
                           1.34211205 -2.
                                             1.23074746 -41
                                                               1.1342977 = -2,
                                                                                 60255
                           7.9244980E -3,
7.1171509E -3,
                                             9.3313724E -3,
         1.0570030E - 2.
                                                               8.4121765t -3,
                                                                                 06256
         1.6925193E -3,
                                             6.63887346 -3.
                                                               6.2213479E -3.
                                                                                  00257
         5.40173846 -3,
                           5.61570,50 -3.
                                             5.3004400E -3,
                                                               5.1425121E -3,
                                                                                  00258
         4.9445016E -3,
                           4.75445156 -3,
                                             4.58767856 -3,
                                                                4.44483476 -3,
                                                                                  00259
                                                                                 00200
         4.3074545E -3.
                           4.1733190t -3,
                                             4.0487699t -3,
                                                                3.4315413t -3,
         3.8248587E -3.
                           3.71047402 -3,
                                             3.62422196 -3,
                                                               3.53410626 -3,
                                                                                 10201
                           3.3565054t -3,
3.6565666t -3,
                                             3.2766233t -3,
2.9911159c -3,
         3.4393463t -3.
                                                               3.2099932E -3,
2.9291540E -3,
                                                                                 00202
         3.13341446 -31
                                                                                 00263
         2.80720941 -3.
                           2.6017609E -3.
                                             2.7506711t -3,
                                                               2.69557426 -3,
                                                                                 00204
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PRATT & WHITNEY AIRCRAFT DIVISION
                                                                                    12/07/78
                                                                        VEK
                                                                                                      PAGE
                                                                                                                  SEKIAL
                                                                                                                  C21265
                                                                                    11.33.02
                                                                                                        46
         2.6420392E -3, 2.5062039E -3, 2.5379118E -3/
                                                                                     00265
       DATA LPHZU /
                                                                                     00206
      . -3.4962907E -5, -3.0740646E -5, -2.2074747E -5, -1.6793136E -5,
                                                                                     00/67
     2 -1.32527/06 -5, -1.01955311 -5, -8.46533686 -6, -7.60961966 -6, 3 -5.26282918 -6, -5.50603438 -6, -4.37939148 -6, -3.27557511 -6,
                                                                                     00208
                                                                                     00209
       -2.7265669E -6, -2.0681700E -6, -1.9174765E -6, -1.5119032E -6,
                                                                                     00210
      5 -1.2015662E -6, -1.1821166E -6, -4.4502355E -7, -8.7104142E -7,
                                                                                     00271
     0 -7.7893962E -7, -8.0486119E -7, -5.8491443E -7, -6.6540767E -7,
                                                                                     00212
     7 -5.35201446 -7, -5.86738326 -7, -4.51174946 -7, -5.25314226 -7, 6 -3.64124656 -7, -5.16206346 -7, -2.71366766 -7, -4.79027536 -7,
                                                                                     00213
                                                                                     002 14
     9 -3.1002091E -7, -3.1000974E -7, -3.100102E -7, -2.3050946E -7, A -4.0158752E -7, -2.4040134E -7, -3.03013139E -7, -2.1500737E -7, B -3.0206716E -7, -2.4323704E -7, -1.8251030E -7, -2.7663023E -7,
                                                                                     01215
                                                                                     00210
                                                                                     00217
     L -1.0949482E -7, -2.9529957E -7, -1.0763431E -7/
                                                                                     06218
        DATA UPHZU /
                                                                                     00279
         5.1234491E -b.
                            4.6143895t -b, 2.9342506t -8, 1.9060603t -8,
                                                                                     00200
                           9.6121801c -9, 4.7539842t -9, 1.3037725c -8, 6.2591270t -9, 3.0661501t -9, 1.5250251t -9, 4.1659333t-10, 1.1265923c -9, d.622C848c-10,
         1.0984095t -8,
                                                                                     00201
     3 -1.3511462E -9,
4 1.02c0799E -9,
                                                                                     Cizoz
                                                                                     00203
                            6.5059193E-10, 2.0535031E-10,
6.1096318E-10, -5.6925681E-11,
         5.38053046-11,
                                               2.0535031E-1C,
                                                                  2.55993935-10,
                                                                                     00204
     6 -7.2004346E-11,
                                                                  1.948500/E-10.
                                                                                     00285
                            3.7650459E-10, -2.0094241E-10, 4.4775045E-10, 6.8566992E-10, -5.7844601E-10, 4.7112938E-10,
      1 -1.4244133E-10,
                                                                                     03200
      0 -4.2800633E-10.
                                                                                     00287
      9 -1.4902453E-10.
                            1.2496667E-10, 2.2808765E-10, -4.5838351E-10,
                                                                                     00286
         4.4/5/2/1E-10,
                            1.74503401-10,
                                               2.50761176-10, -2.48971636-10,
                                                                                     00205
        1.65 08196E-10,
                            1.66687646-10, -2.61444266-10,
                                                                  2.97598381-10,
                                                                                     00290
     L -3.4945764E-10,
                            5.2129246E-10, 2.46/1626E-18/
                                                                                     00291
        DATA AHHZU
                                                                                     00242
       2.3675999 3,
                            2.84509996 3, 3.32319996 3, 3.80199996 3,
                                                                                     00293
                            4.7646990t 3,
                                               5.249998E 3, 7.2308998E 3,
                                                                  5. 138 7448E
                                                                                     00244
         4.262344BE 3.
                                                                                3.
         6.2316998E 3,
                                                                  8.2503998E
                            0.7266998E 3.
                                                                                3,
                                                                                     002 45
         9.2913997E 3,
                            1.0354899E
                                               1-1441400E
                                                                  1.2551399E
                                                                                     00270
                                          4.
                                                             4 ,
                                               1.602/549E
                                                                  1.72352796
         1.30656996
                            1.4844244E
                                          4,
                                                                                     00247
                            1.97215996
                                                                                     06290
         1.84668795
                                               2.09986985
                                                                  2.2297799E
                                                             4,
         4.3617499E
                       4 ,
                            4.4457199E
                                               2.6 315599E
                                                                  2.76918481
                                                                                4 .
                                                                                     00249
                                                             4,
     b
         2.9484895E
                       4 .
                            3.04438491
                                          4,
                                               3.1916149E
                                                                  3.33567485
                                                                                4 .
                                                                                     00360
         3.48040486
                            3.6274248E
                                               3.7751448E
                                                                  3.9240199t
                                                                                     00301
                       4,
                                          4,
                                                             4 ,
         4.0734848E
                            4.22446471
                                               4.37692986
                                                             4,
                                                                  4.5298199E
                                                                                     00302
                       4,
                                          4.
                                                                                     00363
         4.6835898E
                            4.83818986
                                               4.9935698E 4,
                                                                  5.1496998E
                                                                                     00304
         5.306529 Et
                            5.4646298E
                                               5.62212986
        DATA EMMZU
                                                                                     00365
         7.9537975E
                            7.903436KE U.
                       0.
                                               7.972458ZE U.
                                                                  7.9917322E 0.
                                                                                     00310
         8.02Collet
                                                                  8.1797218E
                                                                                0,
                                                                                     00307
                       0.
                            8.000 8187E
                                               E-1101153E
                                                             C.
                                          U·
                                                                  8.5440044
         8.2444950E
                            8.3252472E
                                               8.40881676
                                                             0 ,
                                                                                     00308
                            8.4578348E
                                               4.1504767E
                                                             0 ,
                                                                  4.3507537E
                                                                                     00304
         8.707063EE
                       0,
                                          0.
         4.55331626
                       0,
                            4.7577003E
                                               9.90310516
                                                             G,
                                                                  1.0164633E
                                                                                     00310
                                                                                1.
                       1,
                                                             1,
         1.03668026
                            1.0549659E
                                               1:0735562E
                                                                  1.09130925
                                                                                     00311
                                          1,
                                          1,
         1.1082071E
                       1 .
                            1.1243027t
                                               1.1395917E
                                                             1,
                                                                  1.1540203E
                                                                                 1.
                                                                                     00312
         1.1675771E
                            1.10007126
                                               1.19298821
                                                                  1.20462656
                                                                                1.
                                                                                     00313
                       1,
                                          1 .
                                                             1.
         1.2157557E
                       1.
                            1.22610066
                                               1.23584281
                                                                  1.245 2 780 E
                                                                                     00314
                                                                                1.
                                                             1.
                                          1,
                                               1.2702854E
                                                             1.
                                                                  1.27781616
                                                                                     00315
         1.25404491 1.
                            1.20224241 1.
         1.2849503E 1,
1.3097876E 1,
                           1.2916350E 1.
1.3150503E 1.
                                               1.2980171E
                                                                  1.3040489E 1.
                                                                                     00010
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1.320C110E

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00317

CHARLES AND SERVICE SERVICES AND SERVICES

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PRATT & WHITNEY AIRCRAFT DIVISION
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47
                                                                              VEK
                                                                                            12/07/78
                                                                                                                            SEKIAL
                                                                             10.0
CSG.PAN757
                                                                                            11.33.02
                                                                                                                            021264
         DATA CHHZU
         0.614/610t -5,
                              4.4446814E -5.
                                                  5.5870172E -5.
                                                                      2.65364165 -4.
                                                                                            00319
                              4.5410117t -4,
6.7647748t -4,
          2.1595757E -4,
                                                   4.6744849E -4.
                                                                       5.9265906E -4,
7.4436713E -4,
                                                                                            00320
          5.7856CZ5E -4,
                                                                                            00321
          7.0016421t -4.
                              7.4664541E -4,
                                                                        8.5403126t -4,
                                                   8.1077721E -4.
                                                                                            00322
          6.356062 UE -4,
                              8.6002864t -4,
                                                                        8.3277711E -4,
                                                                                            00323
                                                   8.4612693L -4.
                                                   7.7733759E -41
          8.0146076¢ -4,
                                                                        7.0208097t -4,
                               7.71844844 -4,
                                                                                            00324
          7.0007054E -4,
                               0.4021470t -4,
                                                   6.2886450t -4,
                                                                        5.7351956t -++
                                                                                            00325
          5.5021311t -4,
                              5.3446168E -4,
                                                   4.9145288E -4,
                                                                        4.7840400t -4,
                                                                                            00326
          4.4703450E -4,
3.4511140E -4,
                                                                        3.8746293t -4,
                                                   3.9880724t -4,
                               4.1303970E -4.
                                                                                            00327
                                                                        3.0565709t -4,
                              3.4417752t -4,
                                                   3.2190581t -4,
                                                                                            00328
                                                   2.639738ZE -4.
                                                                       2.3867827E -4,
         2.86859986 -4.
                              2.6803073t -4.
                                                                                            00329
                                                   2.1436645E -4/
          2.3454864E -4.
                              1.9902217E -4.
                                                                                            00330
                                                                                            00331
         UATA UHHZU
                                                   1.16365546 -0, -2.74480986 -7,
          1.57494806 -7, -2.14592786 -7,
                                                                                            00332
                                                   6.95611526 -7, -7.83267306 -8,
8.02029576 -8, 1.15880806 -7,
          1.3c33533E -6,
                              7.38211/7E -8,
2.1686969E -7,
                                                                                            00333
         5.4348461E -7,
                                                                                            00334
                                                 1.2015015E -7, -5.1186781E -8,
          3.4476400E -b.
                              3.3059222E -0.
                                                                                            00335
          8.4500067t -6, -5.5282522t -8, -3.7082840c -8, -8.5000992c -8,
                                                                                            00336
        -8.3041244E -8, 1.5243546E -8, -2.0404616E -7, 1.1104404E -8,
                                                                                            00337
        -1.8294107E -7, -3.1042307c -8, -1.5373594E -7, -4.8073483E -8,
                                                                                            00338
      6 -5.9733398E -8, -1.2785016E -7, -3.6245243E -8, -8.1583571E -8, 9 -9.9985577E -8, -3.9534621E -8, -3.1513060E -8, -1.2319759E -7,
                                                                                            00339
                                                                                            00340
      A 2.9014359E -Y, -6.186587E -8, -4.513537CE -8, -4.605862ZE -8, 
b -5.7857040E -8, -1.1267165E -8, -7.0265414E -8, 2.4039459E -9,
                                                                                            00341
                                                                                            00342
      L -1.1255979E -7,
                              4.26230336 -0, -5.05274786-15/
                                                                                            00343
C *** BASEU UN 60, 120 DEGREE CUDIC SPLINE FITS OF K AND K GAS CONSTITUENOC344
         WITH LAMBUA CUNDITIONS APPLIED AT FRONT END
                                                                                            00345
                                                                                            00346
         VATA TITAB /
         360., 360., 420., 480., 540., 660., 660., 720., 780., 840.,
                                                                                            00347
        760., 1020., 1140., 1200., 1380., 1500., 1620., 1740., 1860., 1780., 2100., 2220., 2340., 2460., 2580., 2700., 2820., 2740., 3600., 3180., 3300., 3420., 3540., 3660., 3780., 3900., 4020., 4140., 4200., 4380., 4500., 4620., 4740., 4860., 4980., 5100.,
                                                                                            00348
                                                                                            00344
                                                                                            00350
                                                                                            00351
         5220 ., 5346. /
                                                                                            00352
         UATA LUT/ 05, 45, 54, 64, 56, 46, 16, 26, 36, 10, 11, 17, 37 / UATA LX / 3.446, 17.413, 55.00, 141.51, 1.e10,
                                                                                            00353
                                                                                            00354
      1 3.407, 10.110, 54.0, 155.34, 346.2, 696.4, 1268.3, 1.810 /
                                                                                            00355
      DATA GTG / 500., 900., 1300., 1700., 2100., 1500., 900., 1300., 1/60., 2100., 2500., 2900., 3300. / DATA GPK / 1.059, 8.411, 32.39, 90.95, 212.1,
                                                                                            00356
                                                                                            00357
                                                                                            06358
       1 1.6457, 0.011, 34.2, 48.64, 235.7, 444.9, 444.7, 1075.3 /
                                                                                            00354
      DATA GKK / .2059, .2799, .659, .2539, .236,
1 .286, .274, .2593, .247, .24, .231, .227, .224 /
                                                                                            00 160
                                                                                            06301
         DATA K, ZMWAIK /1. 78507, 20. 90 910 /
                                                                                            03362
                                                                                             00363
         DATA KK / .5035575/
        16 (101.LT.C) GU TU 160
                                                                                            00304
       DO 100 1C=1,13
                                                                                            06365
        1- (101.tc.101(101) 60 10 120
                                                                                            00306
  100 CUNTINUE
                                                                                            66367
                                                                                            00368
        KETUKN
                                                                                            00369
         A = AKG
        IF (FA-FAOLD)180,140,180
                                                                                            00370
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CONTRACTOR CONTRACTOR CONTRACTOR

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PRATT & WHIINEY AIRCHAFT DIVISION
                                                                         VEK
                                                                                     12/07/78
                                                                                                                  SERIAL
                                                                                                      PAGE
CSG.PAN757
                                                                       10.0
                                                                                     11.33.02
                                                                                                                  021264
  140 IF (WA-WAULD)180,280, LEC
                                                                                      00371
  160 10 = 10
                                                                                      00372
        STELHY = GLHY
                                                                                      00373
C REPLACE CARDS BELOW FUR NEW HER
                                                                                      00374
       HLK = .1600000
HLKM = 1.906349
                                                                                      00375
                                                                                      00376
        LMMF = 13.4316
C
                                                                                      00377
        STULC1 = .6772313
STULC2 = 1.023574
C
                                                                                      00378
                                                                                      00374
        STUIC =
                     .06836219
                                                                                      00380
        1F(GLHV .LE. C.) STOLHV = 18513.
                                                                                      06361
C IF HER IS OTHER THAN .10 GENERATE NEW SPLINE FITS USING GASTAB/DMFIT, 00362 C INSERT NEW CUEFFICIENTS AND CALCULATE COMBINED CONSTANTS 00383
                                                                                      00383
  186 FA = FAULU
                                                                                      00304
        FUZK = AMINI (4.400000++A, 1.023474)
                                                                                      00385
        ZMEA = 4.7642 - FUZK * 7.654757
ZMSP = FUZK * 7.511344
                                                                                      00366
                                                                                      06387
       SPMW = 0.
1+ (2MSF)200,220,200
                                                                                      CC388
                                                                                      00369
  201
        SPMW = 28.48584
                                                                                      00390
  220
        MA = WAULD
                                                                                      00341
       IF (WA. Gt. C.) GL TU 240
                                                                                      00342
        ZMSP = C.
ZMLA = O.
                                                                                      00343
                                                                                      00374
        ZMH2U = 1.
                                                                                      00345
       GU TU 200
                                                                                      00396
C
       THE FULLUWING CHANGES WERE MADE TO INCREASE COMPUTER SPEED
                                                                                      00397
  246 ZMHZU = WA # 1.666665
C 240
         ZMH_U = WA/18.016 # ZMWAIK#4.7642
                                                                                      00399
C 260 TMLS = ZMSP + ZMEA + ZMHZU

260 KTMLS = 1.6/(ZMSP + ZMEA + ZMHZU) **

ZNUMK = 1.0/(ZMSP*SPMW + ZMEA*ZMWAIR + ZMHZU+18.016)
                                                                                      00466
                                                                                     00401
                                                                                      20402
        ZMWT = (ZMSF*SPMW + ZMEA*ZMWAIK + ZMHZO *18.016)*KTMLS
                                                                                      00403
        RAMWT = ZNUMK/RTMLS
                                                                                      00464
  280 60 10 (340,340,660,660,300,620,680,880,880,1140,1080,880,880),10 004(5
  306 	 16 = X
320 	 J1 = 1
                                                                                      00466
                                                                                      00417
  340 11 = 1
                                                                                      00408
                                                                                      00409
        J1 = 4
                                                                                      CC410
        IF (FA.LE.U. .ANU. WA.LE.C.) GU TO 360
                                                                                      00411
                                                                                      00412
        J1 = 12
                                                                                      00413
  360 DU 380 J=11,J1
IF (X.LE.6X(J)) GU TU 400
                                                                                      00414
                                                                                      00415
  386 CUNTINUE
                                                                                      06416
                                                                                      00417
  400 16 = 676(J)*(X/GPK(J))**GKK(J)
                                                                                      00416
        ZK = GKK(J)
                                                                                      00419
        J1 = 10
                                                                                      00420
  426 DU 586 J=1,J1
IF (TG.LT.TTTAB(11)) GU TU 446
                                                                                      00421
                                                                                      00422
C THE CUNSTANTS .C1000000 AND .CC8333333 REPRESENT 6C. AND 120. DEGREE 00423
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The State of the S

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PRATT & WHITNEY AIRCRAFT DIVISION
                                                                                12/07/78
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                                                                                                 PAGE
                                                                                                            SEKIAL
CSG. PAN757
                                                                    10.0
                                                                                11.33.02
                                                                                                            021204
C INCREMENTS USED FUR CUBIC SPLINE FITS
C THE MULTIPLICATION PROCESS IS SELECTED OVER DIVISION DECAUSE OF A
                                                                                 00425
C 3.125 CUMPUTER SPEED FACTUR (REF. UNIVAC 1108 CUMPUTER)
XF1X = ((AMIN1(TG,5339.)-T(TAB(11))*.0083333333)
                                                                                 00426
                                                                                 00447
       IT = 11 + IFIX(XFIX)
                                                                                 06468
      60 10 400
                                                                                 00449
       XFIX = ((AMAX1(16,300.)-[]]AU(1))*.01666666)

1T = 1 + 1F1X(XF1X)
 440
                                                                                 00430
                                                                                 66431
  460 CONTINUE
                                                                                 06432
       UL = 16 - TTTAB(11)
                                                                                 00433
       PHISP = 0.
                                                                                 00434
        PHIEA = 0.
                                                                                 01435
       PH1H2U = 0.
                                                                                 00436
      1F (WA.LT.C.) GU TU 500
                                                                                 00437
       PHIEA = ((DPAIK(11)*CL + CPAIK(11))* DL + DPAIK(11))*DL+APAIK(11)0(458
      1F (FA.LE. 0. ) GU TU 480
                                                                                 06434
       PHISP = ((UPSTUC(1T)*DL+CPSTUC(1T))*UL+BPSTUC(1T))*DL+APSTUC(1T) 00440
  480 1F (WA.EL.C.) GU TU 520
                                                                                 01441
                                                                                 00442
  500 PHIHZU = ((UPHZU(11) + DL + CPHZC(11)) + DL + BPHZU(11))+DL +
          APHZULITI
  520 CUNTINUE
                                                                                 00444
       PHIG = (PHISP*ZMSP + PHIEA*ZMEA + PHIHZU*ZMHZU)*KTMLS
PRG = cXP(PHIG*KK - 23.02585)
                                                                                 06445
                                                                                 00446
      1F 1J.EV.J11 60 10 666
                                                                                 00447
       IF (ABSIX-PRG)/X-. 000021600,600,540
  540 1F (J.EQ.1) 60 10 560
                                                                                 00444
      IF (ALLGIPKG/HGUI.EL.C.) GU TU 600
                                                                                 00450
       ZK = ALUGITG/TGUI/ALUGIPKG/HGUI
                                                                                 06451
  560 166 = 16
                                                                                 00452
       HGL = PKG
                                                                                 00453
  580
       TG = TG*(X/PKG)**ZK
                                                                                 00454
  660 60 10 (1200,640,1160,1220,1160,1220),10
                                                                                 66455
  620 IG = X
                                                                                 00456
  646 11 = 1
                                                                                 00457
      GU TU 680
                                                                                 06458
 660
        16 = 3.55 * A
                                                                                 00459
        16u = 1.
                                                                                 00460
                                                                                 00461
       HGU = .282
        11 = 10
                                                                                 06462
  666 DU 840 J=1,11
                                                                                 00403
      IF (TG.LT. TTTAB(11)) GO TO 700
                                                                                 00464
       XFIX = ((AMINI(TG, 339.)-TTTAB(11))*.00833333)
1T = 11 + IFIX(XFIX)
                                                                                 06465
                                                                                 0(466
                                                                                 65467
      60 TU 720
 700
  700 XFIX = ((AMAX)(TG,3CC.)-T(TAB(1))*.C166666)

IT = 1 + 1FIX(XFIX)

720 CONTINUE
                                                                                 00468
                                                                                 06464
                                                                                 00410
       UL = TG - 111AB(11)
                                                                                 00471
                                                                                 00414
        HGSP = n.
                                                                                 00473
        H6H2U = C.
                                                                                 06474
        LPSP = C.
                                                                                 00475
       IF (WA.LT.O.) GU TO 760
                                                                                 00476
```

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       HGEA = ((OHAIK(17)*DL + CHAIK(17))* UL + DHAIK(17))*DL+AHAIK(11)06477
      16 (FA.LE.O.) GU TU 740
                                                                          66478
       HGSP = ((UHSTUC(11)*DL+CHSTUC(11))*UL+BHSTUC(11))*DL+AHSTUC(11) CC4/9
  746 IF (WA.LU.U.) GU TU 766
                                                                          00400
                                                                          00481
  760 HGHZU = ((DHHZU(11)*DL + CHHZU(17))*DL + BHHZU(17))*DL +
         ANHEULITI
                                                                          00462
  780 CUNTINUE
                                                                          00483
       HG = (HGSP*ZMSP + HGEA*ZMEA +HGHZU*ZMHZU; *ZNUMK
                                                                          CC464
      IF (J. EU. 11) GU TU 866
                                                                          00485
      1r (MG-MGU)860,060,000
                                                                          00486
  800
       T = X - HG
                                                                          00487
      1F (ABS(T)/X-. GUUU21800, 600, 620
                                                                          00468
 826 U = 176 - 1601/(H6 - H60)
160 = 16
                                                                          00469
                                                                          06440
       HGU = HG
                                                                          00441
       16 = 16 + 0*1
                                                                          00444
  860 GU TU (1226, 1180, 320, 1200, 1220, 1180), 10
      16 = AMAX1(300., AMIN1(X,5220.1)
                                                                          00444
      00455
                                                                          00446
       IT = 11 + IFIX(XFIA)
                                                                          06447
      60 10 920
                                                                          00498
      XFIX = ((TG-TT | AD(1)) * .01606066)

iT = 1 + IFIX(XFIX)
 900
                                                                          00444
                                                                          60500
       CUNTINUE
                                                                          00501
       DL = 16 - ITTABLITE
                                                                          00502
       LPEA = 0.
                                                                          00503
       CPSP = 0.
                                                                          00504
       CHZ0 = 0.
                                                                          00565
      IF (WA.LT. 0. ) GU TU 960
       CPEA = ((DHAIR(11)+DHAIR(11)+DHAIR(11))+DL +CHAIR(11)+CHAIR(11)) 00507
      # UL + BHAIR (11)
                                                                          20528
                                                                          00504
      CPSP = ((DmSTOC(1T)+DmSTUC(1T)+DmSTOC(1T))*DL+CmSTUC(1T) +
                                                                          00510
          CHSTUC(IT) # UL + BHS (UC(IT)
                                                                          00511
  946 IF (WA.LQ. 0. ) GU TU 986
  960 GHZU = ((UHHZU(11)+UHHZU(11)+UHHZU(11))*UE + CHHZU(11)+CHHZU(11)00513
1 )*UE + BHHZU(11)
  960 CF = (CPSP+ZMSP + CPEA+ZMEA + CHZU *ZMHZC)*KIMLS
                                                                          00515
       LV = CP - K
                                                                          00516
      IF (ID-12)1600,1100,1120
                                                                          06517
 1000 IF (10-0)1026,1646,1066
                                                                          00518
 1020
       Y = LF#KZMWT
                                                                          00519
      60 TU 1.20
                                                                          00520
 1046 Y = CV*KZMWT
                                                                          00521
                                                                          00522
 1066 Y
          = LP/LV
                                                                          00523
     60 TU 1226
                                                                          00524
 1086
       Y = LMWAIK+KZMWT
                                                                          00525
     60 10 1220
                                                                          00546
 1100 Y = CP#KZMWT*ZMWAIK/CPEA
                                                                          005/7
     60 TU 1220
                                                                          00528
 1120 Y = LP/CV*(LPEA - K)/CPEA
                                                                          00524
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                                                                                                       56
             UATA SET BEOUINJELT AT LEVEL OUT AS UF 12/07/70
            UATA SET BEBUFLAME AT LEVEL 032 AS UF U3/20/78 UATA SET BEBUFLAME AT LEVEL 025 AS UF 03/14/76 UATA SET BEBUFLAME AT LEVEL 017 AS UF 02/20/78
                                                                                    00001
                                                                                    00002
                                                                                    00003
       SUBRUUTINE INJECT (NOL, IEK)
                                                                                     00004
               1) EVALUATE INJECTION DECPLET FORMATION
                                                                                     00005
L PURFUSE
                 2) SET FIVE DRUPLET SIZE GROUPS
                                                                                     00000
                 31 EVALUATE PERCENT VAPORIZED BY INJECTION PROCESS
                                                                                     00007
       CUMMUN /CINFT/FHW, PFSK, PS, TFSK, JFUEL, VA, TA, XF, TAU, ALPHA, FAK
                                                                                     00008
     A, XL, EPS, CUFH, FARME, ISTRM, WEXT, TEXT
                                                                                    00009
       CUMMON /UTPUT/ MOUTA, MOU (F, MUTFLO, MUTFVO, DETAI, 62, DL (5), BL(5),
                                                                                     00010
      ATERISI, MOTHE, RI, PSI, TEREX, BS, TW, ETAPH
A, DED(S), BIE, DMOUT, BUE, RTVD, DWOUT, Y, SE, EPSC, Y, AC, EPSAG, ETAC
                                                                                     00011
                                                                                     00012
      X,510,X1(100),EP5X1(100),S11(100),ETA(100),NSTEP,TAEFF
                                                                                     00013
       CUMMUN /MISC/ KHUA, MUA, ADUCT, PI, LDC, FHW (MP, E11, KM, TFO, ULF 15)
                                                                                     00014
      A, DETAZ (1), ETAW, MUTTLI, TLC, MUUTTL(), FAKW, STBAK, FAKE
                                                                                    00015
       CUMMUN /CKVS/ CKVMUA(44),CKVKM(44),CKVLAM(22),CKVPV(24)
                                                                                    00016
      X.LKVSL (36).LKVPK (30). TRJP4 (283).CKVT SL (26)
                                                                                    66017
      A, CKYCF 1120 J, CKYPT 120 J, CKYPTK124 J, CKYSLE (10), CKYEVP(10), CKYTSP(10) GGG10
       1 ER = (
                                                                                     00019
       NUL = 5
                                                                                     00020
            = PS / 14.7
                                                                                     000/1
    CURVE IS THE SAME FUR JP4 AND JP5
                                                                                    20002
            = -2.788 + .41 * TESR + 1.37E-04 * TESK**2 +
                                                                                    00023
      HH
      x 1.224-67 * TFSR**3
                                                                                     00024
               .54217 + ALUGIPI + .2484
       1F(JFUEL.EQ.11MLF = 79.92 + 27.01 * X- 12.20* X**2+140.4 * X**3+
                                                                                    00026
                                                                                     00027
       14.30 * X**4 - 106.4 * X**5
       IFTUFUEL. CW. 2) LALL UNBARTCRYSLE, 1, X, G.O, HLF, ISI
                                                                                     00028
       IFIUFUEL.EW.11 HVAF = 214.34 - 5.74x - 2.206* X**2 - 7.236 * X**3 00029
       IF(JFUEL.EQ.2) CALL UNBAK(CKVEVP, 1, x, U. G, HVAP, IS)
                                                                                     00000
       BIT = (Mt - MLF) / HVAP
       Ir (817)16,30,20
                                                                                     00032
       60 10 36
  10 017
                                                                                     00033
                                                                                    00034
       ir (011-1136.30.999
                                                                                     660 15
      IFTUFUEL.EG. 11 CALL UNDAK ICKVTSL, 1,P, U.O, TSL, 151
                                                                                     00000
                                                                                     00037
       IF (JFUEL.EL.Z) CALL UNDAK (CKVTSP, 1,P, 0.0, TSL, 15)
       IF (JFULL.EG. 1) TSV = TSL + 172.0
                                                                                     00038
       IFTUFUEL. CU.ZI LALL UNDAK (CHVTSP, 1, 15L, C.J, 15V, 15)
                                                                                     00039
       INC = ISE + B11 * (TSV - TSL)
                                                                                     00040
                                                                                     00044
       1 - ( 1 1 . Eu. C. 0) Tro = TFSK
                                                                                     00042
       UPINJ = PESK - PS
ULIS) = 126. * (100. / DPINJ)**.4
                                                                                     00043
       UL(1) = 6.52 * DL(3)
                                                                                     00044
       DL(2) = 0.864 * DL(3)
                                                                                     06045
       DE(4) = 1.181 * DE(3)
DE(3) = 1.397 * DE(3)
                                                                                     00046
                                                                                     00047
  00 400 1 = 1,5
400 00011 = 00111
                                                                                     00048
                                                                                     00049
       60 TU 1666
                                                                                     00050
C DE(1) --- DE 10
                                                                                     00051
                                                                                     0005/
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C DL13) DL56		00053		
C DL(4) DL70		00054		
C DL(5) DL90		00055		
999 WKITE(0,100)		00056		
100 FORMAT ( ALL FUEL VAPURIZED TERMINATE CASE )		00057		
IEK = 1		06058		
1006 RETURN		00000		
END		00000		

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                                                                                                                             621264
              DATA SET B28DINPUT AT LEVEL 001 AS OF 12/07/78 E33
DATA SET B28DINPUT AT LEVEL 016 AS OF 03/14/78
DATA SET B28DINPUT AT LEVEL 013 AS OF 02/23/78
                                                                                             00061
(
                                                                                             00002
                                   CUSTUMER DECK
          RUMBLE-TURBUFAN VEEGUITER , VURBIX , OR SWIRL AUGMENTUR
                                                                                             00005
  ************************
                                                                                             00006
      SUBRUUTINE INPUT ( A, B, UMEGA, KASE, KV, IFIRST ) 00007
CUMMUN /AUGIN/ JFUEL, NAUGUP, NCUMUP, NFSOP, NPRNTR, NPRNTF 00008
CUMMUN /FLAMIN/ ALPHAC(100), ALPHAH(100), FAC(100), FAH(100), 00009
# FHWC(100), FHWH(100), LSC(100), LSH(100), NSC(100), NSH(100), 00010
# PFSR(100), TAUC(100), TAUH(100), TEXT(100), TFSR(100), TOC(100), 00011
      * Tom(100), WEXT(100), XLC(100), XLH(160), NTC, NTH
                                                                                             OCCIZ
        CUMMON /RMBLIN/ BPR, DPCS, DPD, DPH, DPHS, DPS, EPSC, EPSH, ETA, 00013
      * ETAC, ETAH, FA, FAV, LA, LB, LC, LH, LI, LK, L2, M6C, M6H, M6K, * PKNUZ, PS6, T3H, ZEF, ZEFC, ZEFH, ZEFP, ZEP, ZEPC, ZEPH, ZETC,
                                                                                             00014
                                                                                             00015
       * ZETH, ZEVC, ZEVH, TCLRE
                                                                                             00016
       CUMMUN /FHUUT/ FETAL, FETAH, FFAC, FFAH, FLB, FLI, FLK, FLSC, FLSH,
       * FTOL, FTOH, FZEFC, FZEFH, FZEPC, FZEPH, FZETC, FZETH, FZEVC,
                                                                                             00018
      * FZEVH
                                                                                             00019
        DIMENSIUN A (75.75) . 8 (75)
                                                                                             00000
                                                                                             00021
         CUMPLEX A. S. E
        DIMENSIUN 1P(11), 1V(11), 1K(11)
        DIMENSIUN YL(11), TAU(11), C(11), T(11), TR(11), G(11), PK(11)
                                                                                              36023
        DIMENSIUN TAUF(11), PF(11), VF(11), KF(11)
                                                                                             00024
       DIMENSIUN TAUG(11), PG(11), VG(11), KG(11)
                                                                                             00025
        DIMENSIUN TAUW(11), UUP(11), TAUE(11)
                                                                                             00000
                                                                                             00027
       DIMENSIUM TAUFI(11), TAUGI(11), TAUE1(11)
DIMENSIUM TAUFZ(11), TAUGZ(11), TAUGZ(11)
                                                                                              35000
                                                                                             00029
        CUMPLEX FJ, FK, FU, EF, EG, EE, EW, EFZ, EG1, EE1, EEZ, EDC, EDH
        KEAL LC, LA, L(111, M(11), LH, MH, MGC, MGH, MGK, KNUZ, LSC, LSH, LB
                                                                                             00000
        REAL LIC, LKC, LIH, LKH, L1, LK, L2, LSCKUM, LSHRUM
                                                                                             00001
C VARIABLE DEFINITIONS
                                                                                             00032
C 1P(J), IV(J), IR(J) = PRESSURE, VELUCITY, DENSITY AT STATION J (J=1-11)
                                                                                             06633
G 1P2H, 1V2H, 1K2H = PRESSURE, VELUCITY, DENSITY AT STATION 2H
C 1P3m, IV3H, IK3H = PRESSURE, VELUCITY, DENSITY AT STATIUN 3m
C IW3, IW3H = MASS FLOWRATE AT STATION 3,3H
C IQIN, IQUUT = UPEN LUUP HEAT INPUT, UUTPUT
                                                                                             00036
                                                                                             00057
C VARIABLE NUMBERING CONVENTION

UATA 1P/ 1, 4, 7,20,23,20,29,32,35,38,41/

DATA 1V/ 2, 5, 8,21,24,27,30,33,36,39,42/
                                                                                             00038
                                                                                             00039
                                                                                             00040
        DATA IN/ 3, 6, 4, 22, 25, 28, 31, 34, 37, 40, 43/
                                                                                              00041
        DATA 1P3H, 1V3H, 1K3H, 1P2H, 1V2H, 1K2H/10, 11, 12, 13, 14, 15/
                                                                                             00042
        DATA 1Q1N, 1W3, 1W3H, 1QUUT/16, 17, 18, 19/
                                                                                             00043
      00044
                                                                                             00045
                                                                                             00040
                                                                                             00048
                                                                                             00049
                                                                                             00050
      * KG / li*G. /, QUP / ll*G. /
                                                                                             00051
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C CHANGES REQUIRED TO MATE WITH F/H LUMB. MUDEL -
                                                                                      00053
C ADD NPKNTE
                                                                                      00054
                                                                                      00055
C UUTPUT
                                                                                      00056
      NAMELIST /TKNSFK/ FETAL, FETAH, FFAC, FFAH, FLB, FLI, FLK, FLSC, 00057 FLSH, FTOL, FTOH, FZEFC, FZEFH, FZEPC, FZEPH, FZETC, FZETH, FZEVC, 00058
      * FZCVH
                                                                                      00059
                        /KNUZ, FAAB, ETAAB, DTIAB, DTAB, T6M, TKL, XLHV
       NAMELISTAUNT
                                                                                      06060
       NAMELIST/FANC /UTC, WCGT,
                                                                                      00061
                         DTIL, IAUDL
                                                                                      00002
       NAMELIST/LUREL /DTH, UHQT,
                                                                                      00063
                          DTIH, TAUDH
                                                                                      00064
       NAMELIST/FANP /ZTFL
                                                                                      00005
       NAMELIST/LUKEY /ZIFH
                                                                                      00006
       NAMELIST/VSUUT /DT, DT1
                                                                                      00007
                          ZTF, FAVIT, TOM, TF, DTIP, UTIT, FAT
                                                                                      00066
       NAMELIST/LJ
                                                                                      00069
       NAMELIST/YLJ
                        /YL
                                                                                      00076
       NAMELIST/MJ
                         /M,Mn
                                                                                      00071
       NAMELIST/CJ
                        16,6n
                                                                                      00072
       NAMELIST/GJ
                        /6,6m
                                                                                      00073
       NAMELIST/TJ
                                                                                      00014
       NAMELIST/PKJ
                        /PKHUT
                                                                                      00075
       NAMELIST/TAUFY /TAUF, TAUFN
                                                                                      00076
       NAMELIST/TAUGY /TAUGH TAUGH
                                                                                      00077
       NAMELIST/TAUES /TAUE, TAUEM
                                                                                      00078
       NAMELIST/QOPJ /QUP
IF INCOMUP.NE.21 GC TC 1
                                                                                      00079
                                                                                      COORD
       ETAL = FETAL
ETAH = FETAH
                                                                                      00001
                                                                                      00082
       FAC(1) = FFAC
                                                                                      C0083
       FAH(1) = FFAH
                                                                                      60084
       L1 = FLX
LK = FLK
                                                                                      00085
                                                                                      00086
                                                                                      00087
       LSC(1) = FLSC
LSH(1) = FLSH
                                                                                      00068
                                                                                      00069
       To((1) = + To(
                                                                                      00040
       Tom(1) = +76H
                                                                                      00071
       Zeru = FZEFU
ZEFH = FZEFH
                                                                                      00042
                                                                                      CCCY3
       ZEPC = FZEPC
                                                                                      00044
       LEPH = FLEPH
                                                                                      06095
       ZEIG = FZEIG
                                                                                      00090
       ZETH = FZETH
                                                                                      00047
       ZEVH = FZEVH
                                                                                      00098
                                                                                      66644
    1 FACKUM = FAC(1)
                                                                                      00100
       FAHRUM = FAH 11)
                                                                                      00161
       LSCHUM = LSC(1)
                                                                                      00102
       LSHRUM = LSH(1)
TOURUM = TOU(1)
                                                                                      00103
                                                                                      00104
       TOHKUM = Tom (1)
                                                                                      00105
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S= CMFLX (U., UMEGA )		00106		
1F (1F1KST .NE. U ) 60 TU 30		00107		
C LLWEK HEATING VALUE OF FUEL		00108		
1 ( U + U + L + L + L + L + L + L + L + L +		00109		
IF (JFUEL . EU. 2) ALHV = 18500.		00110		
L MIXEL TEMPERATURE BEFLER ANY CUMBUSITUN		00111		
TOM = bPK/(1.+cPK)+TOLKUM+1./(1.+BPK)+TOHKUM		00112		
C VITIATED F/A BEFURE ANY COMBUSTION		00113		
FAVIT = FAV/(1.+BPK)		00114		
60 TU (c, 1, 81, NAUGUP		90115		
6 CUNTINUE		00116		
C/*********************************** VEEGUTTEK CUMBUSTION ******	********	**** 00117		
C FAN STREAM TEMPERATURE KISE		00148		
CALL TIDEAL (FACKUM, U., PSO, LOCKUM, XLHV,		00119		
A UTIC, DIIPC, DIIIC, FATC, IFC, ZIFC)		00120		
UIC = UTIC*ELAC		00121		
TCLLU = 10CKUM+DTL		00122		
C CURE STREAM TEMPERATURE KISL		06123		
CALL TIDEAL (FANKUM, FAV, PSO, TOHKUM, XLNV,		00124		
A Ulin, Uliph, Uliln, raln, Trn, Zfrn)		CC125		
DIN = DIIH*ETAH		00120		
THUI = lonkum+Din		00127		
C AUGMENICK MIXED EXHAUST TEMPERATURE		00128		
TRC = bPK/(1.+BPK)+TCULD+1./(1.+BPK)+THUI		00129		
C FRACTION OF TOTAL HEAT KELEASE CONTRIBUTED BY FAN, CURE	STREAMS	0(130		
ucet = c.		00151		
CHCT = 0.		00132		
X = BPK*UTC+UTH		00133		
IFIX . GT. C. IUCUT = EPK#DIC/X		00154		
1+(X .61. (.) UHUT = D[H/X		06135		
C AUGMENTUK UVERALL FUEL/AIK		00136		
FAAD = EPR/(1.+BPR)+FALKUM+1./(1.+BPR)+FAHKUM		0(157		
GU TU Y		06138		
7. CUNTINUE		00139		
C8************************ VUKDIX CUMBUSTION ********	*******	*** 00140		
C TEMPERATURE RISE		00141		
CALL FIVEAL (FA, FAVIT, PSO, 10M, XLHV,		0.01+2		
X U11,U11+,U111,+A1,1+,21+)		00143		
U1 = E744U11		00144		
C AUGMENTUR MIXED EXHAUST TEMPERATURE		0(145		
INC = 16M+UT		00140		
FAAL = FA		00147		
60 10 9		00148		
8 CONTINUE		00149		
C9*********************** SWIKL CUMBUSTION ********	********	*** CC150		
C TEMPERATURE KISE		00151		
CALL TIDEAL (FA, FAVIT, PSC, TOM, XLHV,		00152		
X UTI,UTIP,UTI(,FAT,TF,ZTF)		00153		
UI = ETA*UII		00154		
C AUGMENTUR MIXED EXHAUST TEMPERATURE		00155		
TAL = 16M+UT		0(156		
FAAD = FA		00157		
9 CUNTINUE		00128		

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                                                                       VER
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                                                                                   11.33.62
C AUGMENTUR OVERALL EFFICIENCY
                                                                                    00159
      CALL TIVEAL (FAAB, FAVIT, PSO, TOM, XLHV,
                                                                                    00160
      X DTIAB, DUM, DUM, DUM, DUM, DUM)
DTAB = TKC - ToM
EFAAB = DTAB/DTIAB
                                                                                    00161
                                                                                    00162
                                                                                    00163
C COMBUSTIUN ZUNE STATIUNS
                                                                                    00104
      NC = 5,
                                                                                    00105
                                                                                    00100
               = 1C+NC
       KL
                                                                                    00167
             = KC-1
      KLMI
                                                                                    00168
              = IC+1
       IC 1
            = 10+1
                                                                                    06169
      ILMI
                                                                                    00170
       KCP1
               = KC+1
                                                                                    00171
C LENGTH CALCULATIONS
                                                                                    00172
      LI = AMINI (AMAXI(LI, 0.), Lb-1.)

LK = AMINI (AMAXI(LK, LI+1.), LB)
                                                                                    OC173
                                                                                    00174
       L(2)
              = L2
                                                                                    60175
             = AMINI(L(4),LL)
       LIZI
                                                                                    00176
       LB
               = AMINI(Lb,LA)
                                                                                    00177
       L(3)
             = LA-Lb
                                                                                    00178
             = LC-L(2)
       L(1)
                                                                                    00179
       L(4)
                                                                                    00180
     UU 14 J=1C,KCM1
L(J) = (LK-LI)/NC
L(KU) = LA - L(S) - LK
                                                                                    13100
                                                                                    00182
                                                                                    00163
C STATION LUCATIONS REFERENCED TO STATION 1
                                                                                    00164
      Y(1) = 0.

DO 20 J=2,KCP1
YL(J) = YL(J-1)+L(J-1)
                                                                                    00185
                                                                                    00186
 20
                                                                                    00187
C TEMPERATURES
                                                                                    00168
       T(1) = TOURUM
                                                                                    00169
       1121
               = 1(1)
                                                                                    00190
       1131
             = 1(2)
                                                                                    00191
               = TOHKUM
       TH
                                                                                    00192
       T(4)
               = 16M
                                                                                    00143
       T(16) = T(4)
                                                                                    00174
       TINC) = THE
                                                                                    00195
       T(KC) = AMAX1(T(KC), T(1C)*1.001)
                                                                                    00196
       DU 15 J=1CP1,KCF1
                                                                                    00197
                                                                                    00198
               = (YL(J)-YL(1C))/(LK-L1)
              = AMINI(AMAXI(X,C.),1.)
= T(IL)+(T(KL)-T(IL))*X
                                                                                    00199
      1(3)
 15
                                                                                    00200
C GAMMAS & SUNICS
                                                                                    00201
       GH = 1.45-9.64E-3*TH +1.47E-8*TH **2
CH = 497.1*SURT(GH *TH )
                                                                                    06202
                                                                                    00203
       DU 13 J=1, KCP1
                                                                                    CC204
             = 1.45-9.04E-5+T(J)+1.47E-6+T(J)++2
= 497.1*SWKT(G(J)+T(J))
       G(J)
                                                                                    00205
 13 (())
                                                                                    00206
C MACHS
                                                                                    00207
              = MOL
                                                                                    00218
       M(2)
               = M(1)
                                                                                    00204
             = M(2)
= M6R
       M(3)
                                                                                    00210
       M(4)
                                                                                    002.1
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       M(14) = M(4)
                                                                                  00212
              = M6H
      MH
                                                                                  00213
       PRHUT = 1.
                                                                                  05214
       00 19 J=1C,KC
                                                                                  00215
      TR(J) = T(J+1)/T(J)

X = 1.+G(J)*M(J)**2
                                                                                  00216
                                                                                  00217
       PRIJI
              = .5*X+.5*SURT(X**2~4.*(A-1.)*TR(J))
                                                                                  062.0
              = PRHUT*PR(J)
       PRHUT
                                                                                  00219
      M(J+1) = M(J)*SWRT(TK(J))/PK(J)
                                                                                  00220
C DELAYS UPSTREAM OF COMBUSTION ZUNE
                                                                                  06221
      TAUH(1) = LH/CH
TAUFH = TAUH(1)/(1.+MH)
TAUGH = TAUH(1)/(1.-MH)
                                                                                  OCZZZ
                                                                                  00223
                                                                                  00224
       TAUEN = TAUH(1)/MH
                                                                                  00225
      DU 12 J=1,1CM1
                                                                                  00226
      TAU(J) = L(J)/C(J)
TAUF(J)= TAU(J)/(1.+M(J))
                                                                                  00227
                                                                                  00228
  TAUG(J)= TAU(J)/(1.-M(J))
12 TAUE(J)= TAU(J)/M(J)
                                                                                  00229
                                                                                  00230
L DELAYS DUWNSTREAM OF COMBUSITUM LUNE
                                                                                  00231
              = KL
                                                                                  00232
       TAU(J) = L(J)/C(J)
TAUF(J)= TAU(J)/(1.+M(J))
                                                                                  00235
                                                                                  00234
       TAUG(J)= TAU(J)/(1.-M(J))
                                                                                  CLZ35
       TAUE (J)= TAU (J)/M(J)
                                                                                  00236
C CUMBUSTION ZUNE DELAYS
                                                                                  00237
       DU 16 J=10,KCM1
                                                                                  0(238
       TAULUI = LLUI/CLUI
                                                                                  00239
       TAUF(J)= TAU(J)/(TK(J)-1.)*2./M(J)*ALUG((1.+M(J)*SURT
                                                                                  00240
      ( (TK(J)))/(1.+M(J)))
TAUG(J)= TAU(J)/((R(J)-1.)*2./M(J)*ALUG((1.-M(J))/
                                                                                  00241
                                                                                  00242
                (1.-M(J)*SURT(TR(J))))
                                                                                  00243
       TAUE(J)= TAU(J)/(TR(J)-1.1/M(J)*ALUG(TR(J))
                                                                                  00244
       TAUF1(J)= TAU(J)/(TK(J)-1.)*2./M(J)*ALUG((1.+M(J)*SURT
                (.5*(1.+TK(J))))/(1.+M(J)))
                                                                                  00240
       TAUGICUJ= TAUCJ)/(TR(J)-1.)*2./M(J)*ALUGC(1.-M(J))/
                                                                                  00/+1
       (1.-M(J)*SWRT(.D*(1.+TK(J)))))
TAUE1(J)= TAUE(J)/(TK(J)-1.)/M(J)*ALUG(.5*(1.+TK(J)))
                                                                                  01748
                                                                                  00249
       TAUFZ(J)= TAUF(J)-TAUFL(J)
                                                                                  66250
       TAUG2(J) = TAUG(J) - TAUG1(J)
TAUE2(J) = TAUE(J) - TAUG1(J)
                                                                                  00251
                                                                                  00252
C VULUMETRIC HEAT KELEASE KATE/PRESSURE
                                                                                  00253
    WOP(J) = G(J)/(G(J)-1.)*M(J)/TAU(J)*(TK(J)-1.)
                                                                                  00254
       GUPIKCI= GUPIKCMII
                                                                                  00255
C COMBUSTION LONE MACH NO. FUNCTIONS
                                                                                  00256
      DU 17 J=16,KC
                                                                                  00257
               = M(J)
                                                                                  00258
       PFIJI
             = (1.-Y-Y*+2)/(1.-Y**2)
                                                                                  00259
       VF(J)
              - (.5+1.5*Y-Y**Z*(1.+(1.+Y)*G(J)/2.))/(1.-Y**2)
                                                                                  06260
               = Y/(1.-Y**2)
       KF(J)
                                                                                  00261
              = (1.+Y-Y**2)/(1.-Y**2)
       PG(J)
                                                                                  00262
               = (.5-1.5*Y-Y**2*(1.+(1.-Y)*G(J)/2.))/(1.-Y**2)
       VULUI
                                                                                  06203
       KG(J) =-Y/(1.-Y**2)
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       CUNTINUE
                                                                                               00265
C BURNING PARTICLE DRIFT DELAYS
                                                                                               00266
        TAUQ(IC) = TAUE(ICMI)
DU 18 J=1CP1,KCM1
                                                                                               00267
                                                                                               00268
        TAUW(J)= TAUQ(J-1)+TAUE(J-1)
 18
                                                                                               00269
        IF (NAUGUP .NE. 1)GU TU 25
                                                                                               00270
C DRIFT DELAY FROM SPRAYBAK TO FLAMEHOLDER
                                                                                               00271
        TAUDC = LSCHUM/C(3)/M(3)
TAUDH = LSHRUM/CH/MH
                                                                                               00272
                                                                                               00273
       CONTINUE
                                                                                               00274
C FUR UNCHOKED NUZZLE
                                                                                               00275
        J = KC
PKCKIT = ((G(J)+1.)/2.)**(G(J)/(G(J)-1.))
                                                                                               00276
                                                                                               00277
        PRN = AMAXI (AMINI (PRNUZ, PRCKIT), 1. GGL)
                                                                                               00278
                 = PKN++((G(J)-1.1/G(J))
                                                                                               00279
        ZPH1Pk = (G(J)-1.1/G(J)/2.*(X/(A-1.)-(G(J)+1.1/(G(J)-1.))
                                                                                               00280
        Y = 1.+(G(J)-1.)/2.*M(J)**2
KNUZ = Y*ZPHIPR/(1.-M(J)**2*(1.+G(J)*ZPHIPK))
IF INPKNTK.GT.O) GO TU 51
                                                                                               00281
                                                                                               00282
                                                                                               00283
        WK11c (0,1000)
                                                                                               00284
                                                                                               00285
 1000 FURMAT (1H1)
        IFINCUMUP .EU. ZIWKITE (G,TKNSFK)
                                                                                               00286
       HRITE (0, UUT )

IF (NAUGUP .EQ. 1) WRITE (0, FANC )

IF (NAUGUP .EQ. 1) WRITE (0, CUREC )

IF (NAUGUP .EQ. 1) WRITE (0, FANP )

IF (NAUGUP .EQ. 1) WRITE (0, CUREP )

IF (NAUGUP .EQ. 1) WRITE (0, VSUUT )
                                                                                               00287
                                                                                               00288
                                                                                               00289
                                                                                               00290
                                                                                               00241
                                                                                               00242
        MKITE 10+LJ
                                                                                               00243
        WKITE 10.YLJ
                                                                                               06244
        WRITE 10,63
                                                                                               00295
                                                                                               00296
        WKITE (6,TJ
                                                                                               00247
        WRITE 10, PKJ
                                                                                               00298
        WRITE 10,63
                                                                                               00244
        WELTE CO.TAUF
                                                                                               00300
        WRITE (6, TAUGJ )
                                                                                               06301
        WRITE (O, LAUEJ )
                                                                                               00362
                                                                                               00303
          ******* + **** + KEWUENCY-INDEPENDENT LUNS ******************
                                                                                               00304
C BLUNDARY CONDITIONS AT FAN DISCHARGE (STA 1)
                                                                                               00305
C CUNTINUITY ISTA 11
                                                                                               00306
       N = 1R(1)
A(N,1R(1) ) = 1.
A(N,1V(1) ) = 1.
A(N,1P(1) ) = 0.
  31 N
                                                                                               00307
                                                                                               00308
                                                                                               00309
                                                                                               00310
        IFINFSOP .EW. 21
                                                                                               00311
       AA(N, 1P(1) ) = 1.76PK
                                                                                               00312
C CLASTANT TEMPERATURE (STA 1)
                                                                                               00313
        N = 1P(1)
A(N,1r(1) ) = 1.
A(N,1k(1) , = -1.
                                                                                               00314
                                                                                               00315
                                                                                               00316
C DUCI/CURE JUNCTION (STA 363H-4)
                                                                                               00317
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          Y = 3+1
                                                                                                                         06310
         K
                                                                                                                         00314
C MEMENIUM (SIA 3-41
                                                                                                                         00320
         N = 1P(J)
GU TO (32,32,33), NAUGUP
                                                                                                                         00321
                                                                                                                         00322
          CUNTINUE
                                                                                                                         00323
         CONTINUE

A(N, Y(J) J = -1.

A(N, Y(K) J = 1.-UPH

A(N, IV(J) J = 2.*UPH*BPK/(1. + BPK)

A(N, IV(J) J = UPH*BPK/(1. + BPK)

A(N, IV(J) J = 2.*UPH/(1. + BPK)

A(N, IV(J) J = UPH/(1. + BPK)

A(N, IV(J) J = UPH/(1. + BPK)
                                                                                                                         00324
                                                                                                                         00325
                                                                                                                         00326
                                                                                                                         00327
                                                                                                                         66328
                                                                                                                         06324
          60 TU 34
                                                                                                                         00336
33
          CUNTINUE
                                                                                                                         00331
          A(N,1P(J) ) = -1.

A(N,1P(N) ) = 1.-DPCS

A(N,1V(J) ) = 2.*DPCS

A(N,1V(J) ) = DPCS
                                                                                                                         00334
                                                                                                                         00333
                                                                                                                         00334
                                                                                                                         00335
          ALN. LVON
                                                                                                                         00356
          AIN, IK3H
                           1 =
                                    6.
                                                                                                                         00357
34 CUNTINUE
C MUMENTUM (STA 3H-4)
                                                                                                                         06338
                                                                                                                         00334
                    = 1936
          N
                                                                                                                         00340
          GU TU (35,35,361, NAUGUP
                                                                                                                         06341
35
          CUNTINUE
                                                                                                                         00342
         A(N,1P3h ) = -1.

A(N,1P1k) ) = 1.-UPh

A(N,1V(J) ) = 2.*UPH*DPK/(1. + BPK)

A(N,1K(J) ) = UPH*DPK/(1. + BPK)

A(N,1V3h ) = 2.*OPH/(1. + BPK)

A(N,1V3h ) = DPH/(1. + BPK)
                                                                                                                         00343
                                                                                                                         00344
                                                                                                                         00345
                                                                                                                         00346
                                                                                                                         00347
                                                                                                                         00346
          60 10 31
                                                                                                                         00344
          CUNTINUE
                                                                                                                         00350
          A(N,1P3m ) = -1.

A(N,1P4K) ) = 1.-DPMS

A(N,1V(J) ) = 6.

A(N,1K(J) ) = 0.
                                                                                                                         00351
                                                                                                                         06352
                                                                                                                         00353
                                                                                                                         00354
          A(N, IVan
                           ) = 2. *UPHS
                                                                                                                         00355
          ALN, IKSH
                            ) = DPHS
                                                                                                                         00356
          CUNTINUE
                                                                                                                         00357
C CUNTINUITY ISTA 3 & 3H - 4)
                                                                                                                         00358
          N = 1K(K)

A(N,1K(K)) = -1.

A(N,1V(K)) = -1.
                                                                                                                         00334
                                                                                                                         00300
                                                                                                                         06301
A(N,1V(J) ) = DPK/(1.+DPK)

A(N,1V(J) ) = BPK/(1.+DPK)

A(N,1K3H ) = 1./(1.+DPK)

A(N,1V3H ) = 1./(1.+DPK)

C ENLRGY (S(A 3 & 3H - 4)
                                                                                                                         00362
                                                                                                                         00363
                                                                                                                         00304
                                                                                                                         00305
                                                                                                                         00306
                     = 1V(K)
                                                                                                                         00307
          A(N,1V(N) ) = -1.
A(N,1P(N) ) = -1.
                                                                                                                         00368
                                                                                                                         00369
          A(N, 1+(J) ) = BPK*(T(3)/TH)/(1.+BPR*(T(3)/TH))
                                                                                                                         00370
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       A(N. IV(J) ) = bPR*(1(3)/TH)/(1.+bPR*(T(3)/TH))
                                                                                       00371
       A(N, IP3H ) =
A(N, IV3H ) =
                                     1./(1.+BPR*(T(3)/TH))
                                                                                       00372
                                      1./(1.+BPR*(T(3)/TH))
                                                                                       00373
C CUNSTANT TEMPERATURE AT TURBINE DISCHARGE (STA 2H)
                                                                                       00374
N = 1 K2H

A(N,1P2H )'= 1.

A(N,1K2H ) = -1.

C BUUNDARY CUNDITION AT NUZZLE (STA 11)
                                                                                       00375
                                                                                       00376
                                                                                       00377
                                                                                       60378
            = KCP1
= 1V(J)
       J
                                                                                       00379
                                                                                       00380
A(N+1V(J)) = -1.

A(N+1P(J)) = .5+KNUZ

A(N+1R(J)) = -.5

C UPEN LUUP INPUT (KEFEKENCED TO STA 4)
                                                                                       00381
                                                                                       00382
                                                                                       00383
                                                                                       00384
       N = 101N
A(N, 101N) = 1.
B(N) = 1.
                                                                                       00385
                                                                                       00386
                                                                                       00387
 30
      CUNITINUL
                                                                                       00388
                                                                                       00369
C FAN DUCT (STA 1-2)
                                                                                       00340
       J = 1
K = J+1
EF = (6x)
                                                                                       00391
                                                                                       00392
               = LEXP(-TAUF(J)*5)
                                                                                       00393
       EG = CEXP(-TAUG(J)*5)
Ec = CEXP(-TAUE(J)*5)
                                                                                       00395
C DASTREAM KUNNING SUNIC WAVE (STA 1 - 2)
                                                                                       00346
               = 1P(K)
       N
                                                                                       00347
A(N,1P(K) ) = -1.

A(N,1P(K) ) = -(6(J)*M(J)*2.*DPD)/(1.*2.*DPD)

A(N,1P(J) ) = EF

A(N,1V(J) ) = EF*G(J)*M(J)

C UPSIREAM KUNNING SUNIC WAVE (STA 1 - 2)
                                                                                       00398
                                                                                       00349
                                                                                       00400
                                                                                       00401
                                                                                       00402
       N
               = 14(3)
                                                                                       00463
       A(N,1P(J) ) = -1.
A(N,1V(J) ) = G(J)*M(J)
                                                                                       00404
                                                                                       00405
       A(N. 1P(K) ) = EG
                                                                                       00406
       A(N, IV(K) ) = -EG*(G(J)*M.J)-2.*DPD)/(1.+2.*DPD)
                                                                                       00407
C DISTREAM KUNNING ENTRUPY WAVE (STA 1 - 2)
                                                                                       00468
       00404
                                                                                       00410
                                                                                       00411
                                                                                       00412
                                                                                       00413
                                                                                       00414
C FAN DUCT (STA 2-3)
                                                                                       00415
       J
             = 2
= J+1
                                                                                       00416
                                                                                       00417
       EF = LEXP(-TAUF(J)*5)
EG = CEXP(-TAUE(J)*5)
EE = LEXP(-TAUE(J)*5)
                                                                                       00418
                                                                                       00419
                                                                                       00420
C DISTREAM RUNNING SUNTE WAVE (STA 2 - 3)
                                                                                       00421
                                                                                       004//
       A(N, IP(K) ) = -1.
                                                                                       00423
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         A(N,1V(K) ) = -(6(J)*M(J)+2.*DPS)/(1.+2.*DPS)
        A(N.17(J) ) = EF.
A(N.17(J) ) = EF*G(J)*M(J)
                                                                                                         00425
                                                                                                         00446
C UPSTREAM KUNNING SUNIC WAVE (STA 2 - 3)
                                                                                                         00447
        N = 1V(J)

A(N,1P(J) | = -1.

A(N,1V(J) ) = G(J)*M(J)

A(N,1P(K) ) = EG

A(N,1V(K) ) = -EG*(G(J)*M(J)-2.*DPS)/11.+2.*DPS)
                                                                                                         00426
        N
                                                                                                         00449
                                                                                                         00450
                                                                                                         0(431
                                                                                                         06432
C DASTREAM KUNNING ENTRUPY WAVE (SIA 2 - 3)
                                                                                                         00433
        N = IK(K)
A(N,1K(K) ) = -1.
A(N,1K(K) ) = G(J)
                                                                                                         00434
                                                                                                         00435
                                                                                                         00436
        A(N,1Y(K) ) = (G(J)-1.)*2.*UPS/(1.*2.*DPS)
A(N,1Y(J) ) = EE
A(N,1Y(J) ) = -EE* G(J)
                                                                                                         00437
                                                                                                         00438
                                                                                                         00439
C LUKE ENGINE TRANSFER FUNCTION (STA 1-2H)
                                                                                                         00440
        N = 1V2H
A(N,1V2m ) = -1.
A(N,1N2m ) = -1.
                                                                                                         00441
                                                                                                         00442
                                                                                                         00443
         A(N, 14(1) ) = 0.
                                                                                                         01444
A(N,1P(1)) = 0.

If (NFSUP .Eu. 2)

XA(N,1P(1)) = 1./(1.+TCURE*S)

C TUREINE DISCHARGE (STA 2H-3H)

EF = CEXP(-TAUFH*S)

EG = CEXP(-TAUGH*S)

EE = CEXP(-TAUGH*S)
                                                                                                         06445
                                                                                                         00446
                                                                                                         60447
                                                                                                         06448
                                                                                                         00450
C DNSTREAM RUNNING SUNIC NAVE (STA 2H - 3H)
                                                                                                         00421
        N
                  = 1V3H
                                                                                                         00452
        A(N.1P3n ) = ~1.

A(N,1V3n ) = ~6H *MH

A(N,1P2n ) = EF

A(N,1V2n ) = EF*6H *MH
                                                                                                         00455
                                                                                                         06454
                                                                                                         00455
C UPSTREAM KUNNING SUNIC WAVE (STA ZH - 3H)
                                                                                                         00457
                 = 1724
                                                                                                         00458
        A(N,1PZH ) = -1.

A(N,1VZH ) = GH *MH

A(N,1PZH ) = EG
                                                                                                         0(454
                                                                                                         00400
                                                                                                         06461
                                                                                                         00462
                         1 = -EG#GH #MH
         AIN, IV3m
C DNSTREAM RUNNING ENTRUPY WAVE ISTA 2H - 3ml
                                                                                                         00403
        N = 183H

A(N,1P3H ) = -1.

A(N,1R3H ) = GH

A(N,1P2H ) = EE
                                                                                                         00464
                                                                                                         00405
                                                                                                         00466
                                                                                                         00467
                         1 = -EL +GH
                                                                                                         61468
         AIN. IRZM
C IGNITION PLANE TO COMEUSTION ZUNE (STA 4-5) - INCLUDE LENGTH
                                                                                                         0(469
                                                                                                         06470
        EG = CEXP(-(TAUF(J)+L(3)/C(J)/(1.+M(J)))*S)

EC = CEXP(-(TAUG(J)+L(3)/C(J)/(1.-M(J)))*S)

EC = CEXP(-(TAUG(J)+L(3)/C(J)/M(J))*S)
                                                                                                         00471
                                                                                                         00472
                                                                                                         00473
                                                                                                         00474
                                                                                                         00415
C DNSTREAM RUNNING SUNIL WAVE (STA 4 - 5)
                                                                                                         00476
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PRATT & WHITNEY AIRCRAFT DIVISION
                                                                                                   12/07/78
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                                                                                                                        PAGE
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                                                                                                                                      621269
                                                                                                    00477
                  = 1P(K)
        A(N,1P(K) ) = -1.
A(N,1V(K) ) = -G(J)*M(J)
                                                                                                    00478
                                                                                                    00479
        A(N,1P(J) ) = EF
A(N,1V(J) ) = EF*G(J)*M(J)
                                                                                                    00400
                                                                                                    00401
C UPSTREAM KUNNING SUNIC WAVE (STA 4 - 5)
                                                                                                    00482
                 = 18(3)
        N
                                                                                                    00483
        A(N,1P(J) ) = -1.

A(N,1V(J) ) = G(J)*M(J)

A(N,1V(K) ) = EG

A(N,1V(K) ) = -EG*G(J)*M(J)
                                                                                                    CC484
                                                                                                    00485
                                                                                                    00400
                                                                                                    00467
C DNSTREAM KUNNING ENTRUPY WAVE ISTA 4 - 5)
                                                                                                    00488
        N = 1k(k)

A(N,1P(k) ) = -1.

A(N,1k(k) ) = G(J)

A(N,1P(J) ) = EE

A(N,1K(J) ) = -EE# G(J)
                                                                                                    00409
                                                                                                    00490
                                                                                                    06471
                                                                                                    00442
                                                                                                    00443
C CUMBUSTION LUNE ISTA 5-101
                                                                                                    00444
        DU 40 J-16, KCM1
                                                                                                    00445
               = J+1
= CEXP(-TAUF (J)+5)
                                                                                                    C(440
        K
        tr
                                                                                                    00447
              = LEXP(-TAUFZ(J)*5)
= LEXP(-TAUG (J)*5)
                                                                                                    00498
        EG
                                                                                                    00499
               = LEXPI-TAUGICUT+ST
        261
                                                                                                    00500
                = CEXPI-TAUE (JI+SI
                                                                                                    00501
        FE
                 = LEXP(-TAUE1(J)+5)
        te1
                                                                                                    00502
                = LEXPI-TAUEZIJI+SI
        tt2
                                                                                                    00503
                  = LEXPI-TAUL (J)+5)
                                                                                                    00504
C DUWNS TREAM KUNNING SUNIL WAVE (STA 5-0,6-7,7-8,6-4,4-10)
                                                                                                    00505
        Irraimag(s) .tw. 0.) 60 Tb 50
FJ = (EF -EF2)/5
FK = (1. -EF2)/5
                                                                                                    00506
                                                                                                    00507
                                                                                                    60508
        FW
                  = M(J)*(EF -EE1*EF2)/S + M(K)*(EF2*EE1-EE)/S
                                                                                                    00504
        GU TU 51
                                                                                                    00510
              = -TAUF1(J)
= TAUF2(J)
                                                                                                    00511
 50
                                                                                                    00512
                  - MIJI*ITAULTIJI-TAUFILIJI + MIKI*ITAUEZIJI-TAUFZIJI)
        Fu
                                                                                                    00513
                                                                                                    00514
        CUNTINUE
 51
                 = 1P(K)
                                                                                                    06515
        N
        A(N,1P(J)) = -(G(J)-1.)*UDY(J)*PY(J)*FJ-EF
A(N,1V(J)) = -(G(J)-1.)*UDY(J)*VY(J)*FJ-EF*G(J)*M(J)
                                                                                                    01510
                                                                                                    06517
        A(N, Ix(u) ) = -(6(u)-1.)****(J)**F(J)*FJ
                                                                                                    06518
        A(N,1P(K)) = \{G(J)-1..\}+UP(J)+P+(K)+FK+1.
A(N,1V(K)) = \{G(J)-1..\}+UP(J)+V+(K)+FK+G(J)+M(K)
A(N,1K(K)) = \{G(J)-1..\}+UP(J)+K+(K)+FK
A(N,1UN) = \{G(J)-1..\}+UP(J)
A(N,1UN) = \{G(J)-1..\}+UP(J)
                                                                                                    00514
                                                                                                    00520
                                                                                                    00521
                                                                                                    00522
C UPSTREAM KUNNING SUNIC WAVE (STA 5-0,6-1,7-8,8-4,9-10)

IF(AIMAGES) .et. C.) GU TU 52

FJ - (1. -EGI)/S

FR = (EG -EGI)/S
                                                                                                    00523
                                                                                                    00545
                                                                                                    005/6
                 = M(J)*(1. -LG1*EE1)/5 + M(K)*(EG1*EE1-EG*EE)/5
                                                                                                    00527
        +v
        60 10 53
                                                                                                    00528
                 = TAUGICAL
                                                                                                    00529
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PRATT & WHITNEY AIRCRAFT DIVISION
                                                                                VEK
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                                                                                                                  04
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       FK
                = -TAUG2(J)
                                                                                              00530
                = M(J)*([AUG](J)+TAUE](J)) + M(K)*(TAUG2(J)+TAUE2(J))
       Fu
                                                                                              00551
                                                                                              00532
       CUNTINUE
                = IVIJI
                                                                                              00533
       \begin{array}{lll} A(N_1P(J)) &=& (G(J)-L_*)*\Psi U P(J)*P G(J)*F J + L_* \\ A(N_1V(J)) &=& (G(J)-L_*)*\Psi U P(J)*V G(J)*F J - G(J)*M(J) \\ A(N_1V(J)) &=& (G(J)-L_*)*\Psi U P(J)*V G(J)*F J - G(J)*M(J) \\ A(N_1V(K)) &=& (G(J)-L_*)*\Psi U P(J)*P G(K)*F K - E G \end{array}
                                                                                              00534
                                                                                              005 35
                                                                                              00530
                                                                                              00537
       A(N, IV(K) ) = -(6(J)-1.)*ULP(J)*V6(K)*FK+EG*6(J)*M(K)
                                                                                             00538
       A(N,1K(K) ) = -(G(J)-1. )*46P(J)*RG(K)*FK
                                                                                              06539
       *FU*EQ
                                                                                              00540
C DUWNSTREAM RUNNING ENTRUPY WAVE (STA 5-6, 6-7, 7-8,8-4,4-10)
                                                                                              00541
       1F(A1MAGIS) .EV. 0.1 60 TU 54
                                                                                              00541
             = (EE -EE2)/S
= (1. -EE2)/S
= TAUE(J)*EE
                                                                                              00543
       FJ
                                                                                              06544
       HK
       FU
       GU TU 55
                                                                                              06546
                = -TAUET(J)
                                                                                              00547
               = TAUEZIJI
- TAUE IJI
       FK
                                                                                              00548
       FW
                                                                                              00549
                                                                                              00550
 55
      CUNTINUE
                = IR(K)
       N
                                                                                              00551
       A(N,1P(J)) = -(G(J)-1.)*QUP(J)*FJ-EE

A(N,1V(J)) = -(G(J)-1.)*QUP(J)*FJ
                                                                                              00552
                                                                                              00553
        A(N, IK(J) ) =
                                                     cE*6(J)
                                                                                              00554
       A(N,1P(K)) = (G(J)-1.)**UP(J)*FK+1.
A(N,1V(K)) = (G(J)-1.)**UP(J)*FK
                                                                                              00555
                                                                                              00556
        A(N, 1K(K) ) =
        A(N,141N ) = -(6(J)-1.)*40P(J)*FU*EQ
                                                                                              00558
       CUNTINUE
                                                                                              00559
C CUMBUSTION LUNE TO NULLE (STA 10-11)
                                                                                              00560
       J
              = KL
                                                                                              00561
               = J+1
                                                                                              00502
        EF
                 = LEXPI-IAUFIJI#SI
                                                                                              00563
                                                                                              06504
              = CEXPI-TAUGIJI#SI
                = LEXPI-TAUE(J)*S)
                                                                                              00505
C DNSTREAM KUNNING SONIC WAVE (STA 10 - 11)
                                                                                              00500
       1
                = IFINI
                                                                                              00507
        A(N+1+(K) ) = -1.
                                                                                              20508
       A(N, IV(J)) = EF * G(J) * M(J)
A(N, IV(J)) = EF * G(J) * M(J)
                                                                                              00509
                                                                                              00571
L UPSTREAM KUNNING SUNIC WAVE (STA 10 -11)
                                                                                              00572
       N
                = 17(3)
                                                                                              00573
       A(N,1P(J) ) = -1.

A(N,1V(J) ) = G(J)*M(J)

A(N,1P(K) ) = EG
                                                                                              00574
                                                                                              00575
        AIN, LV(K)
                      1 = -E6*6(J)*M(J)
                                                                                              00577
C DASTREAM KUNNING ENTRUPY WAVE (STA 10 - 11)
                                                                                              00578
       N = IK(K)

A(N,1P(K) ) = -1.

A(N,1K(K) ) = G(J)

A(N,1P(J) ) = EE
                                                                                              00579
                                                                                              00580
                                                                                              00581
                                                                                              00582
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      A(N, IK(J) ) = -EE*G(J)
                                                                              00583
C FAN STREAM MASS FLUWKATE (STA 3)
                                                                              00584
      N = 1W3
A(N,1W3 ) = -1.
A(N,1V(3) ) = 1.
A(N,1K(3) ) = 1.
                                                                              00585
                                                                              00586
                                                                              00587
                                                                              00500
C CURE STREAM MASS FLUWRATE (STA 3H)
                                                                              00569
                                                                              00590
      N
             = 1w3H
      A(N,1m3m ) = -1.
                                                                              00541
      A(N,1V3H) = 1.

A(N,1K3H) = 1.
                                                                              00542
                                                                              00593
C UPEN LUUP UUTPUT (REFERENCED TO STA 4)
                                                                              00544
      GU TU (63,64,65), NAUGUP
                                                                              60595
                                                                              00596
 63 CUNTINUE
00597
      N
            = 10CUT
= CEXP(-TAUDC+S)
                                                                              00548
      FOC
                                                                              00599
      AIN, 1 & WT ) = -1.
                                                                              00660
      A(N,1W3 ) = QCQT*(1.-(2TFC+ZEFC)*EUC)
A(N,1V(3) ) = QCQT*ZEVC
                                                                              00601
                                                                              00662
      A(N,1P(3) ) = UCUT*(ZEPC+ZETC)
                                                                              00603
      A(N, IK(3) ) = -ULUT+ZETC
                                                                              00664
            = LEXP(-TAUDH*S)
      EUn
                                                                              00605
      A(N,1W3H) = GHVT*(1.-(2TFH+ZEFH)*EUH)

A(N,1V3H) = GHVT*ZEVH

A(N,1V3H) = GHVT*(ZEPH+ZETH)
                                                                              00606
                                                                              CC667
                                                                              00608
      A(N, IKON ) = -UNUT#ZETH
                                                                              00609
      A(N,1P(+) ) = C.
                                                                              0(610
      GU TU 66
                                                                              60011
      CONTINUE
                                                                              00612
00613
      N
             = 14001
                                                                              00614
      A(N, ILUUT ) = -1.
                                                                              00615
      A(N,1W3 ) = (1.-ZTF-ZEF)*BPK/(1.+BPK)-ZEFP*BPK/(1.+BPK)
A(N,1W3H ) = (1.-ZTF-ZEF)/(1.+BPK)-ZEFP/(1.+BPK)
                                                                              00016
                                                                              00617
      A(N,1P(4) ) = ZEP
A(N,1P(3) ) = C.
                                                                              06018
                                                                              00619
       A(N,1V(3) ) =
                       0.
                                                                              0620
      A(N, IK(3) ) =
                                                                              06021
      AIN,1P3m 1 =
                       0.
                                                                              00622
      A(N,1V3H ) = C.
                                                                              06623
      A(N, IKSH ) = 0.
                                                                              00624
      60 TO 66
                                                                              00025
      CUNTINUE
                                                                              06626
06027
      N = IQUUT

A(N,IQUUT ) = -1.

A(N,IW3 ) = (1.-ZTF-ZEF)*bYK/(1.+BYK)-ZEFP

A(N,IW3H ) = (1.-ZTF-ZEF)/(1.+bYK)

A(N,IY(4) ) = LEP

A(N,IY(3) ) = C.
      N
                                                                              66628
                                                                              00629
                                                                              00630
                                                                              00631
                                                                              00632
                                                                              00655
       A(N,1V(3) ) =
                                                                              00654
      A(N,1K(3) ) = 0.
                                                                              00035
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	T & WHITNEY	AI	IK.	KAFT DIVISION	VEK 10.0	12/07/78	PAGE 66	SERIAL 021209
	AIN, IF 3H	)	=	0.		00636		
	AIN, IV 3H	)	=	6.		00637		
	AIN, IKSM	)	=	0.		00638		
66	CUNTINUE					00639		
	IFIRST =	1				06640		
	KETUKN					00641		
	END					00642		

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                                           AT LEVEL 001 AS UF 12/07/78
                DATA SET BEBUMAIN
               DATA SET BEBUSLUNCE AT LEVEL OUT AS UF 04/05/78
                                                                                                        00001
               DATA SET BEBULMBAUG AT LEVEL OUT AS OF 03/17/76
                                                                                                        00002
                                                                                                        00003
        CUMMON /FLOG/ TITLE, STITLE, NAME!, NAME?, KI
COMMON /FHOUT/ FETAC, FETAH, FFAC, FFAH, FLb, FLI, FLK, FLSC,
                                                                                                        00004
       * FLSM, FTOL, FTOM, FZEFL, FZEFH, FZEPL, FZEPH, FZETL, FZETH,
                                                                                                        00005
                                                                                                        00006
       * FZEVL, FZEVH
        CUMMUN /AUGIN/ JFUEL, NAUGUP, NCUMUP, NFSUP, NPKNTK, NPKNTF
                                                                                                        00007
       CUMMUN / HLAMIN/ ALPHAC(100), ALPHAH(100), FACI(100), FAHI(100), FHWH(100), FHWH(100), LSUI(100), LSHI(100), NSU(100), NSU(100), SHI(100), FEXTI(100), TEXTI(100), TEXTI(100), TEXTI(100), NTC, NTH
                                                                                                        00008
                                                                                                        00009
                                                                                                        06010
                                                                                                        00011
        CUMMON /RMBLIN/ BPK, UPLS, UPU, DPH, UPHS, UPS, EPSC, EPSH, ETA,
                                                                                                        00013
       * ETACI, ETAHI, FA, FAV, LA, LB, LCI, LHI, LII, LKI, LZ, MOC, MOH, MOK
       + PKNUZ, PSO, 13H1, ZEF, ZEFUI, ZEFHI, ZEFP, ZEP, ZEPUI, ZEPHI, ZETCI,
                                                                                                        00014
       * LETHI, LEVEL, LEVHI, TOUKE, WOULL
                                                                                                        00015
        CUMMUN/SV/SAVTE(2), SAVTA(2), SAVDT(2), SAVFAR(2), SAVDT(2), SAVETA(2), SAVDT(2), ZCV(2), ZCP(2), ZCT(2),
                                                                                                        00016
                                                                                                        00017
                LUFALLI, SAVVALZI, TEXAVG, ETAAVG, XMUTAD, FARAVG, TAAVG, XMUTFD,
                                                                                                        00018
                TEXTI(100), SIMDIA(100), SIMUTH(100), STTA(100), STVA(100),
                                                                                                        00019
                FARMK (100), ETAS(100), DTF10L(100), ATR(100), ETAAVP, SAVLI(2),
                                                                                                        00020
                SAVER(2), SAVXES(2), SET(100), SEK(100), SES(100), SVFAC(100),
                                                                                                        00021
                FACAVG, TEXAVS, 1WTI (160), SLb(100), SAVXLb(2), 12(2)
                                                                                                        00022
       MEAL LA, LD, LU, LH, LI, LN, LZ, MOC, MOH, MOR, LSU, LSH, * NAMEI, NAMEZ, LII, LKI, LSUI, LSHI, LUI, LHI
                                                                                                        00023
                                                                                                        00024
          NAMELIST /INPUT/ ALPHAC, ALPHAN, BPR, UPCS, UPD, DPH,
       * UPHS, DPS, EPSC, EPSH, ETA, ETAC, ETAH, FA, FAC, FAH,
                                                                                                        00026
      * DPHS, DPS, EPSC, EPSCH, ETAC, ETAC, ETACH, FAR, FAC, FARH,

+ FAV, FRINC, FRINCH, JFUEL, LA, LB, LC, LH, LI, LK,

* LSC, LSH, LZ, MGC, MGH, MGK, NAUGUP, NCUMOP, NESUP,

* NPKNIF, NPKNIK, NSC, NSH, NIC, NIH, PFSR, PKNUZ, PSG,

* fauc, Tauh, Tcure, Teat, Ifsr, Ish, IGC,

* Toh, McUUL, Mexi, Zef, Zefc, Zefh, Zefh, Zefp, Zepc, Zeph,

* ZeTc, Zefh, Zevc, Zewh, XLC, XLH, STUP
                                                                                                        00027
                                                                                                        00028
                                                                                                        00029
                                                                                                        00000
                                                                                                        00032
          UIMENSION TITLE (20), STITLE (19), GIVI (2002), GIV2 (39),
                                                                                                        00033
       NAME1(26,3), NAME2(26,3),TEXI(100), TFSR(100), T6C(100),T6H(100),00034
       * FAL(100), FAN(100), LSC(100), LSH(100), TAUH(100)
NAMELIST / CUMBIN/ ALPHAC, ALPHAH, BPK, DPD, DPH,
* UPS, EPSC, EPSH, FAC, FAH,
                                                                                                        00035
                                                                                                        06036
                                                                                                        00037
       * FAV, FHWC, FHWH, JFUEL, LA, LC, LH,

* LSC, LSN, LZ, MOC, MON, MCK, NAUGUP, NCUMUP, NESUP,

* NPKNTF, NPKNTK, NSC, NSH, NTC, NTH, PESR, PKNOZ, PSG,

* TAUC, TAUH, TCURE, TEXT, TESK, T3H, T6C,
                                                                                                        00038
                                                                                                        00039
                                                                                                        00040
                                                                                                        00041
         IOH, WLULL, WEXT, ALL, XLH
                                                                                                        00042
        NAMELIST/VELGUT/BPK, DPU, DPH, UPS, ETAL, ETAH,
                                                                                                        00043
       A FAL, FAM, FAV, JFUEL, LA, LE, LL, LM, LI, LK, LSC, LSM,
                                                                                                        60044
          LZ, MOL, MOH, MOR, NAUGUP, NCOMUP, NESUP, NPKNTK,
                                                                                                        00045
       A PRNUL , PSO , TCURE , TOC , TOH , ZEFC , ZEFH , ZEPL ,
                                                                                                        00046
                               LEPH, LE IL, LE TH, ZEVE, ZEVH
                                                                                                        00047
        NAMELIST/VURBIX/BPK.DPD.DPH.DPS.ETA.FA.
                                                                                                        00048
                                FAV, JFUEL, LA, LB, LL, LH, LI, LK,
                                                                                                        00044
       X LZ,MOL,MOH,MOR, NAUGUP, NCUMUP, NESUP, NPRNTK,
                                                                                                        00050
       X PRNUL, TLUKE, PSO, TOL, lon, LET, LEPP, LEP
                                                                                                        00051
        NAMELISTISMIKE /BPK, DPCS, DPU, DPHS, DPS, EIA, FA,
                                                                                                        00052
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                                                                                             00053
                            FAV, JFUEL, LA, LB, LL, LH, LI, LK,
      X LZ, MGL, MOH, MOK, NAUGUY, NCUMUY, NESUP, NPKNIK,
                                                                                             00054
      X PKNUZ, PSO, TCUKE, TOC, TOH, LEF, LEFP, LEP
                                                                                             00055
        NAMELIST /FLAME/ ALPHAL, ALPHAN, BPR,
                                                                                             00056
      * EPSC, EPSH, FAC, FAH,
                                                                                             00057
      * FAV, FRWC, FRWR, JFUEL,

* LSC, LSM, MOC, MOH, NCUMUP,

* NPKNTF, NSC, NSM, NTC, NTM, PFSK, PSO,

* LAUC, TAUH, TEXT, IFSK, TSH, TGC,

* Tom, WCUUL, WEXT, XLC, XLM
                                                                                             00058
                                                                                             06059
                                                                                             00060
                                                                                             00001
                                                                                             00002
        ENUTVALENCE (GIVILL), ALPHACILLI, (GIVZ(1), DPK)
                                                                                             00063
        UU 5 1 = 1, 2002
GIVI(1) = 0.
                                                                                             00064
                                                                                             00065
        1r (1.61.39) GU TU 5
                                                                                             00000
        6142(1) = 0.
                                                                                             00067
     5 CUNTINUE
                                                                                             00068
        DU 6 1 = 1, 100

JEXT(1) = 0.

TFSK(1) = 0.
                                                                                             00069
                                                                                             00070
                                                                                             00071
         100(1) = 0.
                                                                                             00072
         Ion(1) = 0.
                                                                                             00073
     & CUNTINUE
                                                                                             00074
         STUP = 0.
                                                                                             00075
        JEUEL = 1
NAUGUP = 1
                                                                                             00076
                                                                                             00077
        NLUMUF = 2
                                                                                             00078
        NESOP = 1
                                                                                             00079
         NPKNIK = 0
                                                                                             00000
        NPKNTH = 1
                                                                                             00081
         TCURE = .605
wCoul = .C
                                                                                             00082
                                                                                             00003
        BPK = .59
                                                                                             00084
                                                                                             00005
        UPU = .664
UPn = .632
UPHS = 6.
                                                                                             00086
                                                                                             00087
                                                                                             00088
         UPS = 0.
                                                                                             00089
        EPSH = .04
EPSH = .04
ETA = 0.
                                                                                             00090
                                                                                             00091
                                                                                             00092
         ETAC = .4
                                                                                             00093
         :TAH = .91
                                                                                             00044
         FA = (.
                                                                                             00095
                                                                                             0(046
                                                                                             00097
        LA = 02.
                                                                                             00058
         LC = 72.
                                                                                             00099
                                                                                             06100
         L1 = 5.
                                                                                             00101
         LK = 66.
LZ = 3c.
Moc = .15
                                                                                             00102
                                                                                             06163
                                                                                             00164
         MoH = .26
                                                                                             00105
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M6K = .22		06166		
PRNC2 = 4.4		60107		
ZEF = 0.		00108		
ZEFC = -5.5		00109		
Ztfm = .4	,	00110		
ZEFP = 0.		0(111		
ZEP = 6.		00112		
ZEPC = 0.		00112		
ZEPH = 0.		0(114		
4±16 = 6.		00115		
ZE1H = G.		00115		
ZEVC = C.		00117		
ZEVH = C.		CC118		
NTC = 1				
NTH = 1		00119		
PSo = 7.92		00120		
13n = 1355.		00121		
ALPHAC(1) = 60.		00122		
FAC(1) = .05950		00123		
FHWC(1) = 1.06		06124		
		06125		
LSC(1) = 4.0 $NSC(1) = 1$		00126		
		00127		
PFSK(1) = 134.7		00178		
IrSk(1) = 560.		00129		
TAUC(1) = .256		00150		
TEXT(1) = 6.		20131		
WEXT(1) = C.		00132		
16(1) = 700.		0(153		
XLU(1) = 66.		00134		
ALPHAH(1) = 60.		00135		
FAR(1) = .040		00136		
FHWH(1) = .75		00137		
LSH(1) = 6.0 NSh(1) = 1		00138		
11311(1)		00139		
TAUH(1) = .106		00140		
Ion(1) = 1775. XLH(1) = 60.		00141		
		00142		
10 READ (5,20) K1, STITLE		00143		
		00144		
14(2) = 6		00145		
2C FURMAT (11, 1944)		00146		
KEAU (5,1NPUT)		00147		
00 35 M = 1, 100		60148		
TEXTI(M) = TEXT(M)		00149		
(6C1(M) = 16C(M)		00150		
IGH1 (M) = TGH(M)		00151		
TAUHI (M) = TAUH (M)		00152		
TESRI(M) =TESK(M)		00153		
LSCI(M) = LSC(M)		00154		
CSHI(M) = CSH(M)		00155		
FACI(M) = FAC(M)		00156		
FACI(M) = FAC(M) 35 FAHI(M) = FAH(M)		00157		
35 FAHI(M) = FAH(M)		00158		

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                                                                                                               12/01/18
PRATT & WHITNEY AIRCRAFT DIVISION
                                                                                                VEK
                                                                                                                                                       SCHIAL
CSG. PAN751
                                                                                              10.0
                                                                                                                11.33.02
                                                                                                                                                       021209
                                                                                                                00104
          13H1 = 13H
          ZEFC1 = ZEFC
ZEFHI = ZEFH
                                                                                                                 00100
                                                                                                                 00161
                    = LEPL
                                                                                                                00102
          LEPCI
           LEPHI
                    = LEPH
                                                                                                                 0(163
          ZEILI = ZEIL
                                                                                                                 00104
           ZETHI = ZETH
                                                                                                                 00165
           LEVUL = LEVC
                                                                                                                 00100
          ZEVH1 = ZEVH
                                                                                                                 00167
                                                                                                                 00108
          L1: = L1
LK: = LK
                                                                                                                 00169
           LCI = LC
                                                                                                                 60170
           LHI = LH
                                                                                                                 00171
          ETALL = ETAL
ETAHL = ETAH
                                                                                                                 00172
                                                                                                                 00173
           IF (STOP.GT.C.) GU TU 100
                                                                                                                 00174
          CALL CHECK
                                                                                                                 00175
           WRITE (6, 1012)
                                                                                                                 00170
         FORMAT (1H1,21HNAMELIST INPUT VALUES)

IF (NCUMUP.ED.2.AND.NAUGUP.E.1) WRITE (6,CUMBIN)

IF (NCUMUP.ED.1.AND.NAUGUP.ED.1) WRITE (6,VEEGUT)

IF (NCUMUP.ED.1.AND.NAUGUP.ED.2) WRITE (6,VURBIX)

IF (NCUMUP.ED.1.AND.NAUGUP.ED.3) WRITE (6,SWIRL)
1014
                                                                                                                 00177
                                                                                                                 C0178
                                                                                                                 00179
                                                                                                                 00180
                                                                                                                 00161
         IF (NCUMUP.EV.S) WRITE (O,FLAME )
                                                                                                                 06182
           WRITE (6, 1000)
                                                                                                                 00103
 10GC FURMATY//23x,*Inis PRUGRAM CHECKS SPECIFIC INPUTS TO ENSURE REASOUT84
*UNABLE INPUT DATA.*,//,25x,*IF THESE CHECKS ARE NOT SATISFIED THE CO185
*JUB WILL BE TERMINATED.*,//,25x,*VIOLATIONS, IF ANY, WILL BE PRINTODISC
        *EU EELUW-11///
          LALL ERRUR(1, STUP)
           CALL ENKURIZISTUP!
                                                                                                                 CC185
       UL 3C M = 1, 100

| FEXTI(M) = AMAX1 ( 0., TEXI(M) - 400.)

IF (NCUMUP.EU.Z.UR.NCUMUP.EU.3)

* TOCI(M) = AMAX1 ( 0., TOC(M) - 400.)
                                                                                                                 00190
                                                                                                                 00141
                                                                                                                 00142
                                                                                                                 0(193
                                                                                                                 06194
          IF (NCUMUP.EU.Z.UR.NCUMUP.EU.3)
        * [bn](M) = AMAX1 (C., Ton(M) - 40C.)
[FSR1(M) = AMAX1 ( O., TrSk(M) - 460.)
                                                                                                                 00195
                                                                                                                 00140
          LSCI(M) = LSC(M)
LSHI(M) = LSH(M)
FACT(M) = FAC(M)
                                                                                                                CCLYT
                                                                                                                 00146
                                                                                                                 00199
    30 FAHL(M) = FAH(M)
                                                                                                                 00200
           Tani = Tan - 460.
                                                                                                                 00251
           IF (NCUMUP.GE.Z) CALL FHOUMB
IF (NCUMUP.EQ.Z) CALL ERROR(3,STUP)
                                                                                                                 06202
                                                                                                                 00203
           IF (NCUMUP.LT.3) GALL NUMBLE
                                                                                                                 00204
                                                                                                                 00265
           60 10 10
   100 CALL PLUT (0., (., 499)
                                                                                                                 00200
           STOP
                                                                                                                 00207
           ENU
                                                                                                                 CCZUB
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PRATT & WHITNEY ATRICKAFT DIVISION CSG. PAN757
                                                                                 VER
                                                                                               12/01/18
                                                                                                                   PAGE
                                                                                                                                SERIAL
                                                                                10.6
                                                                                               11.33.02
                                                                                                                                021269
              UATA SET B28DPLUTG AT LEVEL 001 AS UF 12/07/18 E33 UATA SET B28DPLUTG AT LEVEL 021 AS UF 02/13/78
                                                                                                OCOC1
        SUBRUUTINE PLUTG(X, Y1, YZ, NPTS, FREQUP, FREFAC, PHASUP, AMPOP, AMPFAC,
                                                                                                00002
              16, YMEN, YMACKS, INURM )
                                                                                                00003
       1 IG, YMEN, YMACKS, INDER ;
REAL NAMEI, NAMEZ, NI, N2
CUMMUN/PLUG/ [IILE, STITLE, NAMEI, NAMEZ
DIMENSIUN NAMEI(20,3), NAMEZ(20,3)
                                                                                                00004
                                                                                                00005
                                                                                                00006
        DIMENSIUN N1 (3) , N2 (3)
                                                                                                00007
        DIMENSIUN X(1), Y1(1), Y2(1)
                                                                                                00008
        DIMENSION FTITL(4), PHT (4), AMPT(4), XFVAL(4), YAMP(4),
                                                                                                CULUY
                    XINC(10)
                                                                                                00010
        DIMENSION TITLE (20), STITLE (19)
                                                                                                00011
        DIMENSIUN IBUF(1000)
DIMENSIUN TEST(4)
                                                                                                00012
                                                                                                00013
        ULMENSIUN YAMPZIAI, AMPTZIAI
                                                                                                C0014
        DIMENSIUN YAPT (4)
                                                                                                00015
        DIMENSIUN YAPL(4), UUT(3)
                                                                                                00016
        DATA HTIIL/ FREY " UENC", "Y-HE", "RTZ "/
UATA PHT / PHAS", "E-DE", "GAIN", " ", " "/
                                                                                                00017
                                                                                                00018
                                                                                                00019
        DATA YAMP /-1.0,0.,1.0,2.0/
                                                                                                00020
        DATA YAMP2/0.,1.,2.,3./
                                                                                                00021
        DATA AMPTZ/4H ,4H0AIN, 4H ,4H /
CATA XFVAL/-1,1.,10.,100./, IFIKST / U /
DATA FUMAT / ' /
                                                                                                00022
                                                                                                00023
                                                                                                00074
        . 3937 CUNVERSION CENTIMETER TO INCHES
                                                                                                00025
        LUNV = .3937
TWUCU = 1.5* LUNV
                                                                                                00026
                                                                                                00027
        IF (1F1KS1.6T.C) 60 TL 5
                                                                                                00028
        CALL PLUTS (160F,1000)
                                                                                                00029
        LALL PLUT ( .0, .75, -3 )
                                                                                                00030
     5 IFIKST = 1
XLTH = 15. * CUNV
                                                                                                00031
                                                                                                00032
        LYLLEX= 115. # LUNV) / 3.
                                                                                                00033
        LYLLY1=(8. + LLNV) / 3.
                                                                                                00034
        LYCLYZ= ( 12. * CUNV ) / 3.0
YPMIN = -360.
DELYP = 90.
                                                                                                00035
                                                                                                00000
                                                                                                CCC37
        J = 0
                                                                                                00038
        ULDVAL = (.
                                                                                                00039
        DU 10 1 = 2, 10
                                                                                                00040
        21 = 1
                                                                                                00041
        VAL = ALUGIC (ZI) * LYCLEX
                                                                                                00042
        J = J + 1
                                                                                                00043
        XINC(J) = VAL - ULDVAL
                                                                                                00044
        ULDVAL = VAL
                                                                                                00045
    16 CUNTINUE
                                                                                                00046
       FAS = C.
FYS = U.
YU = 0. * CUNV
Y= YD + 2 * CUNV
YLTH = YE + 12. * CUNV
1F (FRLWOP .EW. 0) GO TO 19
                                                                                                00047
                                                                                                00048
                                                                                                00044
                                                                                                00050
                                                                                                00051
                                                                                                00052
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72
PRATT & WHITNEY AIRCKAFT DIVISION
                                                                                          12/07/78
                                                                            VEK
10.0
                                                                                                                         SEKIAL
CSG. PAN 151
                                                                                          11.33.02
                                                                                                                         021209
C PLUT GKID LINES UN X AXIS (FKEGUP=1)
UU 16 1 = 1,11
                                                                                           00053
                                                                                           00054
       CALL PLUTIFXS, FYS, 31
                                                                                           00055
       CALL PLUT (FXS, YU, 2)
       LALL PLUT (FXS, YE, 3)
                                                                                           00057
       CALL PLUT(FXS,YLTH,2)
FXS = FXS + TWUCU
                                                                                           8<000
                                                                                           00054
   18 CUNTINUE
                                                                                          00000
      60 10 24
                                                                                           00001
    14 CUNTINUE
                                                                                           00062
C PLUT LUG GRID LINES UN X AXIS
                                                                                           00003
      DU 20 N = 1, 3
                                                                                           00004
       JN = 10
DU 15 NN = 1, 9
                                                                                           00065
                                                                                           00006
       CALL PLUT(FAS, FYS, 3)
CALL PLUT(FAS, YO, Z)
                                                                                           00067
                                                                                           00068
       CALL PLUT (FXS, YE, 3)
                                                                                           00009
       LALL PLUTIFXS, YLTH, 2)
                                                                                           00070
       1F (NN .EG. 9) GO TO 15
FXS = XINC(NN) + FXS
                                                                                           00071
                                                                                           00072
    15 CUNTINUE
                                                                                           00073
                                                                                           00074
   26 CUNTINUE
                                                                                           00075
       LALL PLUT (FXS, FYS, 3)
                                                                                           00076
       CALL PLUTIFXS, YD, 2)
CALL PLUTIFXS, YE, 3)
                                                                                           00077
                                                                                           00078
       CALL PLUTIFXS, YLTH, 2)
                                                                                           00079
    22 CUNTINUE
                                                                                           00080
C PLUT Y1 AXIS, GRIDS, LABELS
YNCK= 2. * LUNV
                                                                                           18900
                                                                                           00082
       XX = XLTH
                                                                                           00083
                                                                                           00084
       IF (PHASOF .EG. 1. / YPMIN = -100.
                                                                                           00085
       YVAL = YPMIN
                                                                                           00006
       DU 35 N = 1,5
                                                                                           00087
       LALL PLUTIC.G, LINC, 3 1
                                                                                           00000
       CALL PLUT(XX, CINC, Z)

CALL NUMBER(-5,CINC-05,.07,YVAL,C.0,C)

CINC = CINC + YNCX

YVAL = YVAL + SC.
                                                                                           00009
                                                                                           00000
                                                                                          00091
                                                                                           00092
    35 CONTINUE
                                                                                           00043
       LALL SYMBULI -. 76,1. ,.14, PH1, 90.,16)
       YIMIN = -360.
                                                                                           00095
                                                                                          00040
       IF (PHASUP .EW. 0.) GU 10 56
                                                                                           00097
       YIMIN = -180.
                                                                                          84000
       Y1MAX = 100.
                                                                                           00099
    SU DELYL = ABSIYIMIN - YIMAXI
C PLUT GRID LINES UN YZ AXIS
                                                                                           00191
                                                                                          00102
       DU 28 1=1,4
CALL PLUT(0., AYY,3)
CALL PLUT(XLTH, AYY, 2)
                                                                                          CC103
                                                                                           00104
                                                                                           06105
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PRATT & WHITNEY AIRCRAFT DIVISION CSG. PAN757
                                                                                                                12/07/78
                                                                                                VEK
                                                                                                                                       PAGE
                                                                                                                                                       SEKLAL
                                                                                               10.0
                                                                                                                                                       021269
     28 AYY = AYY + CYCLY2
                                                                                                                 00106
C PLUT LABELS ON PREQUENCY AXIS , X AXIS

IF (PROFAC . Eq. 0.) FROPAC = 1.

IF (FREQUE . Eq. 0.) GU TU 29
                                                                                                                 00107
                                                                                                                 00108
                                                                                                                 06109
         XMIN = 0.

XMAX = 10G. * FRUFAC

IF (YMAUNS .EU. 0) GO TU ZEE

XMAX = YMAUNS

XMIN = YMEN
                                                                                                                 00110
                                                                                                                 00111
                                                                                                                 00112
                                                                                                                 00113
                                                                                                                 00114
   288 CUNTINUE
                                                                                                                 00115
         DELX = XMAX - XMIN
                                                                                                                 00116
         XM = 0.0
                                                                                                                 00117
         XXINC = ABS(DELX / 10. )

FX = -.20

DU 27 1 = 1, 11

CALL NUMBER (FX,-.2,.(7,XM,G.C,1)
                                                                                                                 00118
                                                                                                                 00119
                                                                                                                 00140
                                                                                                                  00121
         \lambda M = \chi M + \chi \chi INC

F\chi = F\chi + TWUCU
                                                                                                                 00122
                                                                                                                 00123
     27 CUNTINUE
                                                                                                                 06124
        GU TU 31
                                                                                                                 00125
     29 AUD = .5
                                                                                                                 00126
         XA = ALUGIC(FRUFAL)
                                                                                                                 00127
         AA - ACOCTO ADD = -.5
NFAC = XA + ADD
AF = -.20
XFAC = 10. ** NFAC
                                                                                                                 00128
                                                                                                                 00129
                                                                                                                 00130
                                                                                                                 00131
         XMAX = 100 . * XFAL
XMIN = .1 * XFAL
                                                                                                                 061 32
                                                                                                                 C0133
         DELX = ALUGIG(XMAX) -ALUGIC(XMIN)
                                                                                                                  00134
         UU 30 1 = 1, 4
XVLU = XFVAL(1) * XFAL
                                                                                                                 00135
                                                                                                                 00136
     CALL NUMBER(XF,-.2,.C7,XVLU,C.G,Z)

3C XF = XF + CYCLEX

31 CONTINUE
                                                                                                                 66157
                                                                                                                 00138
                                                                                                                 00139
         CALL SYMBULI 2.6, -.42, .14, FT1TL, G.U, 101
                                                                                                                 00140
         THE CAMPIAC .EU. 0.) AMPHAC = 1.

AMPUP = 1. Stiup up AXIS LABELS

1F (AMPUP .EU. 0.) GU TU 320

DU 310 I = 1,4
                                                                                                                 00141
                                                                                                                 00142
                                                                                                                 001+3
                                                                                                                 00144
          YAPL(1) = YAMPZ(1) * AMPFAL
                                                                                                                 06145
   315 YAPT(1) = AMPT2(1)
                                                                                                                 00146
         YZMIN = 0.
                                                                                                                 00147
         YZMAX = 3.0 * AMPFAL
DELYZ = ABS(YZMIN - YZMAX)
                                                                                                                 00148
                                                                                                                 00149
         ATERM = C.
                                                                                                                 00150
         60 10 322
                                                                                                                 00151
         AMPUP = G. SET UP AXIS LABELS
                                                                                                                 00152
   320 ADD = .5
                                                                                                                 00153
         A = ALUGIC (AMPFAC)

IF (A .LT. 7 ) ADU = -.5

A(ERM = IFIX (A+ADU)

YZMIN = -1.0 + ATERM

YZMAX = 2.C + AIERM
                                                                                                                 00154
                                                                                                                 00155
                                                                                                                 00156
                                                                                                                 00157
                                                                                                                 00158
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PRATT & WHITNEY AIRCRAFT DIVISION CSG.PAN757
                                                                                         12/07/78
                                                                            VEK
                                                                                                           PAGE
                                                                                                                       SEKIAL
                                                                                        11.33.02
                                                                                                                       061667
       DELYZ = ABSTYZMIN - YZMAXI
                                                                                         06109
       DU 321 1 = 1,4
YAPL(1) = YAMP(1) + ATEKM
                                                                                         00160
                                                                                         00161
  321 YAPT(1) = AMPT(1)
                                                                                         00102
  322 CUNTINUE
                                                                                         00163
       FY = 1C. * CONV - .C5
DU 32 1 = 1.4
                                                                                         00164
       LALL NUMBER ( -. 5C, FY, . C7, YAPL (11), 0.0,31
                                                                                         06100
   32 FY = FY + LYCLY2
FY = 16. * CUNV
                                                                                         00167
                                                                                         00168
       LALL SYMBULI -. 7C, FY+.5, .14, YAPT, 90., 6 /
                                                                                         00169
       YNURM = 1.0
                                                                                         00170
       1 + ( INOKM .EV. 0 ) GU IU 340
       FREMIN = X(1)
                                                                                          00172
       YNUKM = YZ (1)
                                                                                         001/3
       DU 330 1=2,NPTS
                                                                                         00174
       IF ( X(1) .6T. FREMIN ) GU TO 330
                                                                                         00175
       FREMIN = X(1)
                                                                                         00176
       YNORM = Y2(1)
                                                                                         00177
  336 CUNTINUE
                                                                                         00178
       IF ( YNUKM . E. C. C. C. ) YNUKM = 1.0
                                                                                         01114
       CALL SYMBUL( -.70, FY+1.82, .14, 10HNUKM PT = ,90.0, 10 ) UUT(1) = FUMAT
                                                                                         00180
                                                                                         Oulel
       UUTIZI = FUMAT
                                                                                         00162
       DUT(3) = FUMAT
                                                                                         00183
       CALL FLPDED ( YNORM, 11, 4, OUT, FUMAT )
                                                                                         00184
       CALL SYMBUL ( -.7, FY+3.22, .14, UUT, 40.0, 11 )
                                                                                         00185
  340 CUNTINUE
                                                                                         06186
       CALL SYMBOL( -. 7, 9.1, . 07, STITLE, 0., 76)
                                                                                         00187
       DU 34 1 = 1,3
N1(1) = NAME1(16,1)
                                                                                         00188
                                                                                         00109
   34 N2(1) = NAME2(1G,1)
                                                                                         00190
       CALL SYMBUL (-.7, 4.0, .07, N1, 0.0, 10)
                                                                                         00191
       CALL SYMBULL -. 7,8.5, ... 7, NZ, 0.0, 10)
PLUT PUINTS UN PHASE ANGLE VS FREW PLUT
                                                                                         00142
                                                                                         00143
       SCALX = 15. * CUNV
SCALY1 = 8. * CUNV
                                                                                         00174
                                                                                         00195
       SCALYZ = 12. * CONV
                                                                                         06146
       DU 100 1 = 1, NPTS
                                                                                         00197
       YINEW = (Y1(1) - YIMIN) * (SCALY1 / DELY1) ;
IF (FREWOP .EW. C.) GO TO 90

XNEW = (X(1) - XMIN) * (SCALX / DELX)
                                                                                         00198
                                                                                         00199
                                                                                         00200
       60 TU 95
                                                                                         00201
   90 CUNTINUE
       XNEW = (ALUGIO(X(1)+.CC1) - ALUGIC(XMIN+.CO1)) * (SCALX/DELX)
                                                                                         00203
   45 CUNTINUE
                                                                                         00204
       IF ( ANEW .LT. U. .UR. XNEW .GT. SCALX) GU TU 100 CALL SYMBUL(XNEW, YINEW, .UZ), (, U.O, -1)
                                                                                         00205
                                                                                         00206
  100 CUNTINUE
                                                                                         00207
       Y = 10.+ CUNV
                                                                                         00208
       CALL PLUT (0.6, Y,+3)
PLUT PUINTS UN AMPLITUDE VS FREY PLUT
                                                                                         00209
                                                                                         00210
       IF ( AMPUP .EQ. G. ) YNURM = ALUGIC(YNURM)
                                                                                         00211
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PRATT CSG.P	& WHITNEY ALKUKAFT DIVISIUN AN757	VEK 10.0	12/07/78	PAGE 75	SEKIAL 021269
	DU 110 1 = 1, NPTS		00212		
	IF (AMPUP .EQ. U.) GU TU 105		00213		
	YENEW = (YE(1)/YNURM - YEMIN) * (SCALYE / DELYE )		00214		
	6U TU 47		00215		
105	CONTINUE		00216		
	Y2Ncw = -1.0		00217		
	IF ( YZ(1) .EU. 0.0 ) 60 TU 97		00218		
	Y2(1) = ALUG10(Y2(1) ) - YNURM		00219		
	YENEW = (Y2(1) - YEMIN) * (SCALY2 / DELY2)		00220		
47	IF (FREWUP .EU. O.) GU TU Y8		00221		
	XNEW = (X(1) - XMIN) + (SCALX/DELX)		00222		
	GU TU 99		00223		
98	CONTINUE		00224		
	XNEW = (ALUGIO(X(I)+.UGI) - ALUGIC(XMIN+.GGI)) * (SC)	LX/DELX)	06225		
44	CUNTINUE		00226		
	1F (YZNEW .LT. G.) YZNEW =1		90227		
	IF (YZNEW .GT. SCALYZ) YZNEW=SCALYZ + .1		06228		
	IF (XNEW .LT. UCK. XNEW .GT. SCALX) GO TU 110		00229		
	YZNEW = YZNEW + Y		00230		
	LALL SYMBUL(XNEW, YZNEW, .UZ5, U. C.O1)		00231		
110	LUNTINUE		06232		
	LALL PLUT (9.,(.,-3)		00233		
200	KETUKN		00234		
	END		00235		

	E WHITNEY AIRCKAFT DIVISION	VEK	12/07/78	PAGE	SERIAL
CSG.F	N 157	10.0	11.33.62	70	021209
c	UATA SET BEBUPKNIK AT LEVEL OCT AS UF 12/67/	78 F33			
č	DATA SET BESUPENTE AT LEVEL GIP AS UF OI/30/		00001		
•	SUERUUTINE PRNTK (SYMI, SYM2, SYM3, ILYM1, ILYM2, AMP, X				
	CUMMUN /AUGIN JEUEL . NAUGUP . NCUMUP . NESUP . NPKNI		00003		
	DIMENSION SYMICID, SYMEILD, SYMS(1), VUUTTIGABLE VI		00004		
	• 1CYM1(1), 1CYM2(1)		00005		
	UATA 1, J / 1, 1 /		00006		
	IF (NPKNIK-GT.O) KETUKN		00007		
	MUP1 = MU + 1		00008		
	VUUTICI, JI = AMP		00009		
	VUU12(I,J) = X1		00010		
	J = J + 1		00011		
	1 + 1 J . GE . MUP1) 1 = 1 + 1		00012		
	IF ICU.GE. CUMAX .AND. J.GE. MOPI) GU TU 10		00013		
	IF (J.GE.MOP1) J = 1		00014		
	IF (1.LE.4) KETURN		00015		
10	UU 50 K = 1,3		00016		
	IKM = ICYMI(K)		00017		
	IRMZ = ICYM2(K)		00018		
50	WHITE (0,1000) (SYMILIKM), SYMZ(IKM), SYM3(IKM),		00019		
	* SYM1(1KM2), SYM2(1KM2), SYM3(1KM2),		00020		
	* (VUUT1(N,K), VUUT2(N,K),N=1,4))		00021		
1600	FURMAT (1X, A4, A1, 2X, A2, 1/1, A4, A1, 1X, A2, 8613.6)		00022		
	I = 1		00023		
	J = 1		00024		
	DU 100 11 = 1,4		00025		
	00 100 JJ = 1,MG		00026		
	VUUTI(11,JJ) = 0.		00027		
100	VOUT_(11,JJ) = 0.		00028		
	KETUKN		00029		
	END		00030		

```
PRATT & WHITNEY AIRCRAFT DIVISION CSG. PAN757
                                                                         VEK
                                                                                     12/07/78
                                                                                                       PAGE
                                                                                                                   SEKIAL
                                                                       10.0
                                                                                     11.33.02
                                                                                                                   021209
             DATA SET BESUPENTSV AT LEVEL OOL AS UF 12/07/78
                                                                       E33
             DATA SET BEBUPRNISV AT LEVEL 022 AS UF 01/30/78
DATA SET BEBUPRNISV AT LEVEL 018 AS UF 01/30/78
                                                                                      00001
                                                                                      00002
       SUBRUUTINE PROTSV (SYM1,SYM2,SYM3,AMP,X1,CU,CUMAX)
                                                                                      00003
       CUMMON /AUGIN/ JEWEL, NAUGUP, NCOMOP, NESUP, NPRNTR, NPRNTF
                                                                                      00004
       CUMMUN /PLUG/ TI(LE, STIFLE, NAMEI, NAMEZ, KI
UIMENSIUN NAMEI(20,3), NAMEZ(20,3), STITLE(19), TITLE(20),
                                                                                      00005
                                                                                      00006
      DATA 1, J / 1, 1 /, CUP / 4*0. /
                                                                                      00007
                                                                                      00008
       IF INPRNTH .GT.O) KETUKN
                                                                                      00009
       VUUT1(1,J) = AMP
                                                                                      00010
       VUUT2(1,J) = X1
                                                                                      00011
       IF (J.E4.1) WP(1) = CO
                                                                                      00012
       J = J + 1
                                                                                      00013
       IF (J.Gt.44) I = I + 1
                                                                                      00014
       IF (CU.GE.CUMAX .AND.J.GE.44) GU TO 1C
                                                                                      00015
       IF (J.GE.44) J = 1
                                                                                      00016
       IF (1.LE.4) KETURN
                                                                                      00017
                                                                                      00018
    IC IF INAUGOP.EU.I.AND.N.COMUP.EU.I.AND.N.FSUP.EU.I) WRITE (6,1010)
       IF (NAUGUP.EQ.1.ANU.NCUMUP.EQ.1.AND.NFSUP.EQ.2) WKITE (6,1011)
                                                                                      00019
       IF (NAUGUP.EQ. 2. AND. NCUMUP.EQ. 1. AND. NFSUP.EQ. 1) WRITE (6,1012)
                                                                                      00020
       IF (NAUGUP.EU.Z.AND.NCUMUP.EU.I.AND.NFSUP.EU.Z) WRITE (6,1013)
                                                                                      00021
       IF (NAUGUP.EU.3.AND.NCUMUP.EU.1.AND.NFSOP.EU.1) WKITE (6,1014)
                                                                                      00022
       IF (NAUGUP.EQ.3.AND.NCUMUP.EQ.1.AND.NFSUP.EQ.2) WRITE (6,1015)
                                                                                      00023
       IF (NAUGUP.EU.1.AND.NCOMUP.EU.2.AND.NFSUP.EU.1) WRITE (0,1016)
                                                                                      00024
       IF (NAUGUP.EQ.1.AND.NCOMUP.EQ.2.AND.NFSUP.EQ.2) WKITE (6,1017)
                                                                                      00025
       WRITE (0,1001) K1, STITLE, (COP(L),L=1,4)
                                                                                      00026
       DU 50 K = 1,43
                                                                                      00027
        WKITE 16,1000) (SYMLIK), SYMZIK), SYM3IK),
                                                                                      00028
      * (VUUT1(N,K), VUUT2(N,K),N=1,4))
                                                                                      00024
 1000 FURMAT (1X,2A4,2X,A2,0X,8G13.0)
1001 FURMAT (1X, RUMBLE ,/,1X,11,19A4,/,2GX, FREQUENCY = ,F6.2,
                                                                                      00000
                                                                                      00051
          HERTL', 3x, "FREQUENCY =", Fo. 2," HERTZ', 3x, "FREQUENCY =",
                                                                                      00032
      * Fo.2, HERTZ ,3X, FREQUENCY = FO.2, HERTZ ,/,
* 1x, PARAMTER ID NU. ,7X, GAIN ,5X, PHASE ANGLE ,0X, GAIN ,5X,
                                                                                      00033
                                                                                      00034
      * "PHASE ANGLE", OX, "GAIN", DX, "PHASE ANGLE", OX, "GAIN", DX,
                                                                                      00000
      * 'PHASE ANGLE'
                                                                                      00000
        1 = 1
                                                                                      00007
                                                                                      86000
        DU 100 11 = 1,4
                                                                                      00034
        00 100 JJ = 1,43
                                                                                      00040
        .0 = (LL,11)1Tuuv
                                                                                      00041
                                                                                      00044
  100 VOUTZ (11, JJ) = 0.
        UU 116 KK = 1,4
                                                                                      00043
  ILC CUPIAKI = C.
                                                                                      00044
 1016 FURMAT (1H1, KUMBLE MUDEL WITH VEGGUTIER FLAMEHULDER AUGMENTUR ANDOCC 45
      * PRUXIMATE FLOW SPLITTER USING EMPIRICAL CUMBUSTION DATA : //)
                                                                                      00046
 10.1 FURMAT (1H1, KUMBLE MUDEL WITH VEEGUTIEK FLAMEHULDER AUGMENTUR ANDOCC47
 * REMUTE FLUW SPLITTER USING EMPIRICAL CUMBUSTION DATA*,//) 00046
1012 FURMAT (1H1, RUMBLE MUDEL WITH VURBIX AUGMENTUR AND PROXIMATE FLUWOOG-9
 * SPLITTER USING EMPIRICAL COMBUSTION DATA*,//) CCC50

1013 FURMAT (1H1, "RUMBLE MUDEL WITH VURBIX AUGMENTUR AND REMUTE FLUW SPCC051
#LITTER USING EMPIRICAL COMBUSTION DATA*,//) 00052
```

PRATT & WHITNEY AIRCRAFT DIVISION	VEK	12/0//18	PAGE	SEKIAL
CSG.PAN757	16.0	11.33.02	78	021269
1014 FORMAT (1H1, "RUMBLE MUDEL WITH SWIKE AUGMENTUR A	NU PRUXIMATE	-LUW 00053		
* SPLITTLE USING EMPIRICAL CUMBUSTIUN DATA 1///		00004		
1015 FURMAT (1111, "KUMBLE MUDEL WITH SWIKE AUGMENTUK A	NU KEMUTE FLUE	V SPLOCO55		
*ITTER USING EMPIRICAL CUMBUSTION DATA //)		00056		
1016 FURMAT (1H1, RUMBLE MUDEL WITH VEEGUTTER FLAMENC	LUER AUGMENTUR	ANU00057		
* PRUXIMATE FLUM SPLITTER USING PLAMEHULDER CUMBE	STIUN MUDEL CO	MB 0200028		
*TIUN DATA*,//I		00059		
1017 FURMAT (1H1, "KUMBLE MUDEL WITH VEEGUTTEK FLAMENL	LUER AUGMENTUR	ANU00060		
* REMOTE FLOW SPLITTER USING FLAMEHULDER CUMBUSTI	UN MODEL COMBI	1511000001		
*N DATA *,//)		00062		
KETURN		00063		
END		00004		

RATT & WHITNEY AIRCRAFT DIVISION	VEK	12/07/78	PAGE	SEKIAL
SG. PAN 757	10.0	11.33.02	79	021269
DATA SET BEBUPSIC AT LEVEL OOL AS OF 12/07/78	E33			
FUNCTION PSICIETAW, OTF1, TF, TA, PHI)		00001		
DIF = DIF1 + ETAN		00002		
Tr = IA + UTF		00003		
1F (Pm1 - 1.120,26,30		00004		
26 PSIC = 430.*1.67E+16*EXP(-21150./TF)/TF**1.3*(12.*PHI	*(1ETA.	111 00005		
X**.6)*11PH1+ETAW1/(PH1+ETAW+14.76+PH1*(1.36-ETAW))*	*1.0)	00006		
KETURN		00007		
30 PSIL = 430.#1.11E+11#EXP(-21150./TF)/TF##1.3#1.08#PHI	144.0/ETA	W# 00008		
X((1+TAW)/(4.76-ETAW + .U8+PHI+(1.+1.6+ETAW)))++1.8		00009		
KETURN		00010		
ENU		00011		

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PRATT & WHITNEY ALKUKAFT CIVISIUN
                                                                                             12/07/78
                                                                                                                PAGE
                                                                              10.0
CSG. PAN 151
                                                                                             11.33.02
                                                                                                                   86
                                                                                                                             021269
              UATA SET BEOUPVAL AT LEVEL GO1 AS UF 12/07/78 E33
UATA SET C75CPVAL AT LEVEL GO1 AS UF 07/13/76
                                                                                              00001
C
       FUNCTION PVAL (CUF, X, Y, 11, 16)
                                                                                              00002
C PVAL POLYNUMIAL EVALUATION PROGRAM
                                                                                              00003
           SAME AS PEVAL EXCEPT THIS PRUGRAM IS A FUNCTION SUBPROGRAM
                                                                                              00004
       CUF 15 INE CUEFFICIENT ARRAY, WHERE CUF(1+2) IS THE CURVE IDENTIFICATION AND CUF(3-N) ARE THE LIMITS, DEGREE, AND
                                                                                              00005
C
                                                                                              00000
            CUEFFICIENTS FUR EACH SECTION.
                                                                                              00007
L
       Y 15 AN INDEPENDENT VAKIABLE
Y 15 AN INDEPENDENT VAKIABLE (BIVARIATE)
Z 15 THE DEPENDENT VAKIABLE
11 15 TYPE CURVE INDICATUR
12 THE EKKUR SIGNAL. = 1. X 15 LESS FM
C
                                                                                              80000
                                                                                              00009
C
                                                                                              00010
                                                                                              00011
C
                                              X IS LESS THAN X MIN.
                                                                                              00012
                                        =2. X IS GREATER THAN X MAX.
                                                                                              00013
C
                                         =3. Y IS LESS THAN Y MIN.
                                                                                              00014
c
                                         =4. Y IS GREATER THAN Y MAX.
                                                                                              00015
                                         =5. Y IS LESS THAN Y MIN AND E =1.
                                                                                              00016
                                        =0. Y IS LESS THAN Y MIN AND E =2.

=7. Y IS GREATER THAN Y MAX AND E = 1.

=8. Y IS GREATER THAN Y MAX AND E = 2.
                                                                                              00017
C
                                                                                              00018
1
                                                                                              00014
             IF ANY LIMIT(S) IS EXCEEDED, & WILL BE CALCULATED AT THE LIMITOODED
C
        DIMENSIUN CUFILCE
                                                                                              00021
        x_1 = x
        1= 0
                                                                                              00023
       TEST IF X IS LESS THAN X MIN. IF (XI.LT.COF(3)) GO TO 5
C
                                                                                              0004
                                                                                              00025
        TEST AF X 15 GREATER THAN X MAX. IF (X1.LE.CUF(4)) GU TU 20
                                                                                              00026
C
                                                                                              00027
        SET X EQUAL TO THE LIMIT EXCEEDED.
                                                                                              00028
        X1 = CUF(4)
                                                                                              00029
                                                                                              00030
        6U TO 10
                                                                                              00031
                                                                                              06032
      5 Y 1 = LUF (3)
        SET ERRUR SIGNAL, IE.
                                                                                              00033
    10 1L = 1E + 1
                                                                                              00034
        TEST IF UNIVARIATE UK BIVARIATE.
                                                                                              00035
    20 1F (11.EQ.2) GO TU 100
                                                                                              00036
        UNIVARIATE
                                                                                              100007
        N =5
                                                                                              00038
        TEST IF X IS LESS THAN X MAX UP SECTION.
                                                                                              00039
    JC XN =N
                                                                                              00040
        IF (X1.LE.CUFIN)) GU TU 40
                                                                                              00041
C
        RESET INDEX TO COMPARE X MAX OF NEXT SECTION.
                                                                                              00042
        N = XN + LOF(N+1)+ 5.1
                                                                                              00043
        tel (1) 30
                                                                                              00044
        CALCULATE XBAR = ALPHA*X + BETA
C
                                                                                              00045
    46 XDAK =X1 * CUP(N+2) + CUP(N+3)

CALCULATE Z = AG + XBAK(A1 + XBAK(A2 + XBAK(A3 + ...)
                                                                                              00046
                                                                                              00047
        Z = CUF(N+4)
                                                                                              00048
        11= N+5
                                                                                              00049
    12= XN + 4.1+ CUF(N+1)

00 50 I = II, I2

50 Z = Z * XBAR + CUF(I)
                                                                                              00050
                                                                                              00051
                                                                                              00052
```

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12/07/78
PRATT & WHITNEY AIRCRAFT DIVISION
                                                                                 VER
10.0
                                                                                                                    PAGE
                                                                                                                                 SEKTAL
                                                                                                11.33.02
                                                                                                                      81
                                                                                                                                 021204
        PVAL = 4
                                                                                                 00053
        RETURN
                                                                                                 00054
        BIVARIATE
C
                                                                                                 00055
  100 Y1 = Y
                                                                                                 00056
        TEST IF Y IS LESS THAN Y MIN.
                                                                                                 00057
        1F (Y1.GE.CGF(5)) GU TO 105
1F (1E) 11Q, 116, 130
                                                                                                 00058
                                                                                                 00059
 165 CONTINUE
TEST IF Y 1S GREATER THAN Y MAX.
IF (Y1.LE.CUF(6)) GU TU 150
SET ERRUR SIGNAL, IE.
                                                                                                 00000
                                                                                                 00001
                                                                                                 00062
                                                                                                 00003
        IF (1E) 12C, 120, 14C
                                                                                                 00004
  110 le = 3
                                                                                                 00065
       GU TO 135
                                                                                                 00066
  120 le = 4
                                                                                                 00067
  GU TU 145
130 IE = IE + 4
135 Y1 = CUF(5)
                                                                                                 80000
                                                                                                 00069
                                                                                                 00070
       GU TU 150
                                                                                                 00071
  140 1c = 1t + 6
145 Y1 = CUF(6)
                                                                                                 00072
                                                                                                 00073
  150 N = 7
TEST 1F X 15 LESS THAN XMAX UP SECTION
                                                                                                 000 /4
                                                                                                 00075
  100 XN= N
                                                                                                 00076
        IF (X1.LE.CUF(N)) GU TU 176
                                                                                                 00077
       RESET INDEX TO COMPARE AMAX OF NEXT SECTION N = XN+(LUF(N+1)+1.)+(LUF(N+1)+2.)/2.+0.1
C
                                                                                                 00078
                                                                                                 00079
        60 TU 160
                                                                                                 00080
        CALCULATE XBAR AND YBAR
C
                                                                                                 00001
  170 XBAK = CUF(N+2) * X1 + CUF(N+3)
YBAK = CUF(N+4) * Y1 + CUF(N+5)
CALCULATE Z = (((A1*X+ A2*Y+A3)X+(A4*Y+A5)Y+A0)X+ .....)
                                                                                                 00082
                                                                                                 00063
C
                                                                                                 00004
        11 - CUF(N+1) + .1
NS = N +7
                                                                                                 00085
                                                                                                 00000
        Z = LUFINS-1)
                                                                                                 00087
        J1 = 1
DU 190 1 = 1.11
                                                                                                 00008
                                                                                                 00089
        21 = CUF(NS)

DU 180 J = 1,J1

NSJ = NS + J

21 = 21 * YBAR + CUF(NSJ)
                                                                                                 00090
                                                                                                 00091
                                                                                                 00042
                                                                                                 00043
   180 LUNTINUE
                                                                                                 00044
        Z = Z1 + Z * XBAR
                                                                                                 00095
        J1 = J1 + 1
                                                                                                 00046
   140 NS = NS + J1
                                                                                                 00097
        PVAL = L
                                                                                                 00078
        RETURN
                                                                                                 00044
        END
                                                                                                 00106
```

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PRATT & WHITNEY AIRCRAFT DIVISION
                                                                                      12/07/78
                                                                          VEK
                                                                                                        PAGE
                                                                                                                    SEKIAL
CSG. PAN 757
                                                                        10.0
                                                                                      11.33.02
                                                                                                          82
                                                                                                                    021264
             DATA SET BEODRECIRC AT LEVEL OOL AS UF 12/07/78 E33
       SUBRUUTINE RECIRC
                                                                                       00001
C PURPOSE
              EVALUATE WAKE KELIRCULATION KATE
                                                                                       00002
      CUMMUN /CINPT/FHW, PFSK, PS, TFSK, JFUEL, VA, TA, XF, TAU, ALPHA, FAR
                                                                                       00003
      X.XL. EPS. CUFH. FARMB. ISTRM. WEXT. TEXT
                                                                                       00004
       CUMMON /OTPUT/ MOUTA, MOUTF, MOIFLO, MOTFVG, BETA1, B2, DL(5), B1(5),
                                                                                       00005
      XTLF(5),MDTFC,K1,PS1,TLFcX,b3,TW, ETAFH
X,ULU(5),b1E,UMDOT,BUC,KTVU,DQDOT,Y,SL,EPSO,V,XO,EPSXO,ETAO
                                                                                       00007
      X, STO, X1(100), EPSX1(100), S(1(100), ETA(100), NSTEP, TAEFF
                                                                                       00008
      COMMON /MISC/ RHUA, MUA, ADUCT, PI, LDC, FHW TMP, BIT, KM, TFO, DLF(5) X, BETAZ(5), ETAW, MDTFL1, TLC, MOUTFL(5), FAKW, STBAK, FAKE
                                                                                       00009
                                                                                       00010
       CUMMON /CKVS/ CKVMUA(44), CKVKM(44), CKVLAM(22), CKVPV(24)
                                                                                       00011
      X, CRVSL (36), CRVPK (30), TRJP4 (283), CRVT SL (26)
                                                                                       00012
      X, CRVCPT(26), CRVPT(26), CRVPTR(24), CRVSLE(16), CRVEVP(16), CRVTSP(16) 00013
       KEAL MI, MZ, L, LUD, LDL, KI, LDB
                                                                                       00014
       CBAK = 44.61 * SQRT (TA + 460.)
                                                                                       00015
       MI
            = VÁ / CBAK
                                                                                       00016
       FHWTMP = FHW / 12.
PS = 144. * PS
                                                                                       00017
                                                                                       00018
            = .6076 * ALUGITAU) + 1.463
                                                                                       00019
     L = .0589 * X2**5 - .0093 * X2**4 - .0066 * X2**3 + X .0176 * X2**2 - .6062 * X2 + 2.426
                                                                                       00020
                                                                                       00021
       LOD = EXP(L)
                                                                                       00022
     LUB = LUU * (-1.626E-10 * ALPHA**4 + 7.883E-08 * ALPHA**3
X - 1.508E-05 * ALPHA**2 + 2.046E-03 * ALPHA + .8307)
                                                                                       00023
                                                                                       00024
             = M1 /(1.-TAU)
      LDC = LDB * (1.139 * MZ + .6046)
BUD = 50.4 * TAU**4 - 59.18 * TAU**3 + 47.38 * TAU**2 - 18.97 *
                                                                                       00026
                                                                                       00027
      X TAU + 4.50
                                                                                       00028
      BDC = BDD * (-6.378E-10 * ALPHA**4 + 3.3176-07 * ALPHA**3
                                                                                       00024
      X - 6.769E-05 * ALPHA**2 + 8.09E-03 * ALPHA + .4698)
                                                                                       00030
       RTD = 21.21 / TAU**.25
       T2 = .990 * ALUG(TA+460.) - 6.725
                                                                                       00032
       KIR '= .0266 * 12**4 + .0276 * T2**3 + .2547 * T2**2 + .954 * T2
                                                                                       00033
      X + 1.364
                                                                                       060 14
      BOCC = BUD * 0.66
                                                                                       00035
       RTVD = KTD * KTK * BDC / BDCL
                                                                                       00036
       K1 = 0.8 * LDC * BDC / KTVJ
                                                                                       00037
            = K1 * KHOA * VA * FHWTMP
                                                                                       00038
       VK = .6 * LDL * BDL * FHW MP**2
PSI = A / (VK * PS**2)
PS = PS / 144.
                                                                                       00039
                                                                                       00040
                                                                                       00041
       RETURN
                                                                                       00042
       END
                                                                                       00043
```

PRATI & WHITNEY AIKCRAFT DIVISION	VEK	12/07/78	PAGE	SERIAL
CSG.PAN 157	10.0	11.33.02	83	021269
C DATA SET BEBUREGULA AT LEVEL OOL AS UF 12	/07/78 E33			
SUBRUUTINE REGULAIXL, XK, FCT1, FCT2, KJ, X2, Y2, 1E	K)	00001		
1ck = 6		00002		
YL1 = FCT1(XL)		00003		
YKI = FCTI(XK)		00004		
3 YLZ = FLTZ(XL)		00005		
YKZ = FCT2(XK)		00006		
DTL = (YL1 - YLZ) / YL1		00007		
DTR = (YK1 - YR2) / YK1		00008		
16 X2 = XL - DTL *(XK - XL) / (DTK - DTL)		00009		
Y21=F LT1(X2)		00010		
Y22 = FCT2(X2)		00011		
DT2 = (Y21 - Y22) / Y21		00012		
IF (ABSIDT2)00514C,20,20		00013		
20 IF (KJ .GT. 20)GO TO 50		00014		
KJ = KJ + 1		00015		
IF (DT2 * DTL .LT. 0)60 TO 30		00016		
XL = X2		00017		
DIL = UT2		00018		
GO TU 10		00019		
30 XK = X2		00020		
DTR = DT2		00021		
GU TU 1C		00022		
40 Y2 = Y21		00023		
RETUR N		00024		
50 IER = 1		00025		
RETURN		00026		
END		00027		

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PRATT & WHITNEY AIRCRAFT DIVISION
                                                                                    12/07/78
                                                                                                      PAGE
                                                                                                                  SERIAL
                                                                       10.0
CSG. PAN 157
                                                                                    11.33.02
                                                                                                                  021269
            DATA SET BEBORESULT AT LEVEL OOL AS UF 12/07/76 E33
       SUBRUUTINE RESULT (INDEX, IFIN, IPASS)
                                                                                     occc1
       CUMMUN /AUGIN/ JEUELI, NAUGUP, NCUMUP, NESUP, NPRNTR, NPRNUP
                                                                                     00002
       CUMMUN /FLAMIN/ ALPHAC(100), ALPHAH(100), FAC(100), FAH(100),
                                                                                     00003
     * FHWC(100), FHWH(100), LSC(100), LSH(100), NSC(100), NSH(100),
                                                                                     00004
      * PFSKI(100), TAUC(100), TAUH(100), TEXTI(100), IFSKI(100), Toc(100),
                                                                                     00005
      * ToH(100), WEXT1(100), XLC(100), XLH(160), NTC, NTH
                                                                                     00006
       CUMMUN/KMbEIN/bPK, UPCS, UPU, UPH, UPHS, DPS, EPSC, EPSH, ETAI, ETAC, ETAH, OCCC7
      * FA, FAV, LA, LB, LL, LH, LI, LK, LZ, MOL, MOH, MOK, PRNUZ, PSO, T3H, ZEF, ZEFC,
                                                                                     00008
      * ZEFH, ZEFP, ZEP, ZEPC, ZEPH, ZEIC, ZETH, ZEVC, ZEVM, ICUKE, WCUOL
                                                                                     00009
       REAL LSU, LSH, MOL, MOH, LA, LS, LC, LH, LI, LK, LZ, MOK
                                                                                     00010
     THIS SUBRUUTING STURES TYPE RESULTS, CALCULATES MASS AVERAGES, AND 00011
     SETS UP FUR INFLUENCE CUEFFICIENT KUNS.
                                                                                     00012
       KEAL MOUTA, MOUTF, MOUTAS
                                                                                     CCC13
       CUMMUN /UTPUT/ MUUTA, MUUTF, MUTFLO, MOTFVC, DE FA1, B2, DL (5), B1(5),
                                                                                     00014
     XTLF(5),MDTFC,K1,PS1,TLFCX,E3,TW, ETAFH
X,ULU(5),B1E,DMDTO,BUC,K1V0,UUUU(0,Y,SLU,EPS0,V0,X0,EPSXG,EFA0
                                                                                     00015
                                                                                     00016
      X,510, X1(100), CPSX1(100), S11(100), ETA(100), NSTEP, TAEFF
                                                                                     00017
       CUMMON /MISC/ KHUA, MUA, ADULT, PI, LDC, FHWTMP, 61 (, KM, TFO, DLF (5)
                                                                                     00018
      X, DETAZ (5), ETAW, MOIFLI, ILL, MUUTFL(5), FARW, STOAK, FARE
                                                                                     00014
       CUMMUN /CRVS/ CRVMUA(44), CRVKM(44), CRVLAM(22), CKVPV(24)
                                                                                     00020
      X, CKVSL (36), CKVPK (30), IRJP4 (283), CRVT SL (26)
                                                                                     00021
      X,CRVCPT(26),CRVPT(26),CRVPTK(24),CRVSLE(16),CRVEVP(16),CRVTSP(16) 0UC22
       CUMMUN/SV/SAVTE(2), SAVIA(2), SAVUT(2), SAVFAR(2), SAVDT1(2),
                                                                                     200,3
                                                                                     00024
             SAVETA(2), SAVMDA(2), SAVMDF(2), ZCV(2), ZCP(2), ZCT(2)
             LLFA(2), SAVVA(2), TEXAVG, ETAAVG, XMUTAD, FARAVG, TAAVG, XMUTFD,
                                                                                     00025
             TEXIT (100), STMDTA(100), STMDTF(100), STTA(100), STVA(100), FARWK (100), ETAS(100), DTF1DL(100), ATK(100), ETAAVP, SAVLI(2),
                                                                                     00026
                                                                                     000.7
             SAVLK(Z), SAVALS(Z), SLI(100), SLK(100), SLS(100), SVFAC(100),
                                                                                     00028
             FALAVG, TEXAVS, 1W71 (100), SLB(100), SAVXLB(2), 12(2)
                                                                                     00029
       CUMMUN /CINPT/FHW, PFSK, PS, TFSK, JFUEL, VA, TA, XF, TAU, ALPHA, FAR
                                                                                     00030
      X, XL, EPS, CUFH, FARMB, ISTRM, WEXT, TEXT
                                                                                     00031
       IF (ISTRM .GT. C)GU 10 5
                                                                                     00032
    CURVE IS THE SAME FUR JP4 AND JP5.
                                                                                     00033
       CALL UNDAK (TKJP4, 1, FAK, TA, DTI, IS)
                                                                                     00034
       GU TU 6
                                                                                     00035
     5 UTF = (72000.
                       + 10. + (IA - 1200.))* FARMB
                                                                                     00036
       T3HF = TA - DTF
                                                                                     00037
       FAT = FAKMB + FAR
                                                                                     00038
    CURVE IS THE SAME FUR JP4 AND JP5.

CALL LNBAR (TRJP4,1,FAT,100.,DT00,15)

DTUD = DTUD + .4 * (100. - 13HF)

TEX1 = UTUD + T3HF
                                                                                     00034
                                                                                     00040
                                                                                     00041
       DII = TEXI - TA
                                                                                     00043
     6 DTFIDL (INDEX) = DTI
                                                                                     00044
       ETAS(INDEX) = ETAFH
ATK(INDEX) = ETAFH * UTI
                                                                                     00045
                                                                                     00046
       TEXIT (INDEX) = TA + ETAPH * DTI
                                                                                     00047
       SIMUTA (INDEX) = MOUTA
                                                                                     00048
       SIMUTE(INDEX) = MOUTE
                                                                                     00049
       STVA(INDEX) = VA
                                                                                     00050
       STTA(INCEX) = TA
                                                                                     00051
       FARWK (INDEX) = FARW
                                                                                     00052
```

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                                                                                                                                                                            SEKIAL
                                                                                                            10.0
                                                                                                                                                                            021269
          SLI(INDEX) = X1(1)
                                                                                                                                00053
           SEKTINDEX = XI(NSTEP) - XI(1)
                                                                                                                                 00054
           SLS(INDEX) = AF
                                                                                                                                 00055
           SLB(INDEX) = XL
IF(IFIN .LE. 0) GO TO 1000
                                                                                                                                 00056
                                                                                                                                 00057
           SUMF = 0.0
                                                                                                                                 80000
           SUMA = C.C
                                                                                                                                 00059
           SUMB = 0.0
                                                                                                                                 00000
           SUML = 6.0
                                                                                                                                 00001
           SUMD = 0.0
                                                                                                                                 00062
           SUMG = 0.6
                                                                                                                                 00063
           SUMH = 0.0
                                                                                                                                 00084
           SUM1 = 0.0
                                                                                                                                 00005
           SUMJ = 0.0
                                                                                                                                 00000
           SUMK = C.O
                                                                                                                                 00007
          NT = NTC
                                                                                                                                 00008
           IF(1STRM .EQ. 1)NT = NTH
                                                                                                                                 00069
           UU 10 1=1,NI
                                                                                                                                 00070
           1# (IWT1(1) .EU. 1) 60 TO 10
                                                                                                                                 00071
           IF (ISTHM .EW. O)NS=NSL(1)
                                                                                                                                 000 72
           IF(ISTRM .EQ. 1)NS=NSH(1)
          1F(1STRM .EQ. 1)NS=NSH(1)

SUMA = SUMA + NS * 1EX1!(1) * STMUTA(1)

SUMB = SUMB + NS * STMUTA(1)

SUMC = SUMC + NS * STACI) * STMUTA(1)

SUMD = SUMD + NS * STMUTE(1)

SUMF = SUMF + NS * STVA(1) * STMUTA(1)

SUMG = SUMF + NS * STVA(1) * STMUTA(1)

SUMH = SUMH + NS * SLX(1) * STMUTA(1)

SUMI = SUMH + NS * SLX(1) * STMUTA(1)

SUMI = SUMK + NS * SLX(1) * STMUTA(1)

SUMN = SUMK + NS * SLX(1) * STMUTA(1)

SUMN = SUMK + NS * SLX(1) * STMUTA(1)

SUMN = SUMN + NS * SVFAC(1) * STMUTA(1)

CUNTINUE
                                                                                                                                 00073
                                                                                                                                 00014
                                                                                                                                 00075
                                                                                                                                 00076
                                                                                                                                00077
                                                                                                                                 00078
                                                                                                                                00019
                                                                                                                                 00086
                                                                                                                                 00081
                                                                                                                                 00082
                                                                                                                                 00083
                                                                                                                                00084
     10 CUNTINUE
                                                                                                                                00065
           IF (SUMB .EQ. C.) GU TU 17
                                                                                                                                 00086
                                                                                                                                 00007
           TEXAVE = SUMA/SUMB
          TEXAVS = TEXAVG
TAAVG = SUMC/SUMB
VAAVG = SUMF/SUMB
                                                                                                                                 60008
                                                                                                                                 00009
                                                                                                                                60040
           FARAVG = SUMD/SUMB
                                                                                                                                00091
           IF(ISIKM .LE. C) FACAVG = SUMJ/SUMB
                                                                                                                                 00042
           XLIAVG = SUMG/SUMB
           XLKAVG = SUMH/SUMB
XLSAVG = SUMI/SUMB
                                                                                                                                 000 74
                                                                                                                                 00095
           ALBAVG = SUMK/SUMB
                                                                                                                                00040
           IF(ISIKM .LE. C)GU IU 15
                                                                                                                                 00097
      IF(151KM .LE. C)GU IU 15

DIF = (/2000. + 10. * (!AAVG - 1200.))* FAKMD

T3HF = TAAVG - OTF

FATA = FAKMD + FAKAVG

CURVE IS THE SAME FUK JP4 AND JP5.

CALL UNBAK (!KJP4.],FATA,100.,DTUA,IS)

DIUA = UTUA + .4 * (100. - 13HF)

TEX1 = DTUA + 13HF
                                                                                                                                 06048
                                                                                                                                 00044
                                                                                                                                 00100
                                                                                                                                00161
                                                                                                                                06162
                                                                                                                                00103
                                                                                                                                 00104
           DTIAVG = TEXT - TAAVG
                                                                                                                                 00105
```

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CTAC - TOXAGO TAGO		26:0		
UTAVG = TEXAVG - TAAVG		00106		
GU TU 16		00108		
15 K = (1. + bPK) * WCCUL / (BPK - (1. + bPK) * WCUUL)		00109		
TEXAVG = (TEXAVG + K*TAAVG) / (1. + R)		00116		
C LURVE IS THE SAME PUR JP4 AND JP5.		00111		
CALL UNDAK (TKJP4, 1, FACAVG, TAAVG, DT10Tm, 15)		06112		
C CURVE IS THE SAME FUR JP4 AND JP5.		00113		
CALL UNDAK ([KJP4,1, FAKAVG, TAAVG, UTIUCH, 15)		00114		
ETAAVG = (TEXAVG - TAAVG) / DTILTH		00115		
ETANYP = (TEXAVO - TAAVOI / OTLUCH		0(116		
DILAVG & UTIVIH		00117		
10 XMOTAD = SUMB		00118		
XMDTFD = SUMD * 3600		00119		
17 1F(1PASS-1)20,20,30		00120		
2( 15TK = 15TKM + 1		00121		
SAVTE(ISTK) = TEXAVG		00144		
SAVIA(ISTK) = TAAVG		00123		
SAVUTIISTKI = D'IAVG		00144		
SAVEAR (ISTR) = FACAVG		00165		
IF (151K.EU.Z) SAVFAK(151K) = FAKAVU		00140		
SAVUTI (ISTK) = DTIAVG		00127		
SAVETA(ISTR) = ETAAVG		00128		
SAVMUA(ISTR) = XMUTAU		00129		
SAVMOF (ISTR) = XMOTED		00130		
SAVVALLSTKI = VAAVG		00151		
SAVLI(ISTK) = XLIAVG		06132		
SAVLK(ISTK) = XLKAVG		00133		
SAVXLS(ISTR) = XLSAVG		00134		
SAVXLBIISTKI = XLBAVG		00135		
SAVPS = PS		00136		
30 1F (SUME.EU. (.) 60 TO 950		00137		
IF (SAVETA (ISIK). EU. C.) GU TU 950		01138		
GU TU 1960,40,56,00,761,1PASS		00139		
40 VAI = VAAVG		00140		
LIAVA = LIAAVG		00141		
6U 1L 900		00142		
50 PS1 = PS		00143		
ETAPS = ETAAVG		00144		
60 10 900		00145		
66 FAR1 = FACAVG*0.99		00146		
IF (ISTR.EW.Z) FAR1 = FARAVG		00147		
ETAFAK = ETAAVG		00148		
6U TU 960		00144		
70 TA1 = TA		00150		
LIATA = ETAAVG		06151		
200 (ISTK) = SAVVALISTK) / SAVETA(ISTR) * 11 SAVETAL	STRI - ETAL			
* / (SAVVA(ISTR) - VAI))		00153		
CUPILISTRI = SAVPS / SAVETALISTRI * ( SAVETALISTR) -	ETAPS) /	00154		
* (SAVPS - PS11)		00155		
ZCT(15TK) = (SAVTA(15TK) + 46C.) / SAVETA(15TK) * (	SAVETALISI			
* - ETATAI / (SAVTALISTKI - TALII		00157		
ZCFA(ISTR) = SAVFAR(ISTR) / SAVETA(ISTR) * ((SAVETA)	ISIK) -ETAL	BC1001 NA		

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CSG.PAN757	10.0	11.33.02	87	021269
* / (SAVFAR(ISTR) - FARI))		00159		
12(15TR) = 0		00160		
1PASS = 1		00161		
1+IN = 2		00162		
GO TO 1000		00163		
900 IFIN = C		00164		
IPASS = IPASS + 1		00165		
GU TO 1000		00100		
950 1PASS = 1		06167		
IFIN = Z		00108		
IZ(15/k) ='1		00169		
1000 RETURN		00170		
END		00171		

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                                                                                                                    SERIAL
                                                                                                        PAGE
LSG. PANTST
                                                                         10.0
                                                                                      11.33.02
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            DATA SET BEBUNUMBLE AT LEVEL GGT AS OF 12/67/78 E33
       UATA SEE 845EMAIN AT LEVEL GOT AS UF 12/22/77
                                                                                       00661
                                                                                       00002
       DECK 6458 SULUTION OF COMPLEX SIMULTANEOUS EQUATIONS
                                                                                       00004
       SUBRUUTINE RUMBLE
                                                                                       00005
       CUMMON ZAUGINZ JEUEL, NAUGUP, NCUMUP, NESUP, NPRNIR, NPRNIF
CUMMON ZUTKMZ KMAG, BIMIN, BIMAX, BIDEL, DETERM, IBETA
                                                                                       OCOC6
                                                                                       00007
       CUMMUN AKX, AIX, BR, BI, CK, CI
                                                                                       80000
       COMMUN/PLUG/ TITLE, STITLE, NAMEL, NAME2, KI
CUMMUN/SV/SAVTE(2), SAVTA(2), SAVDT(2), SAVFAK(2), SAVDTI(2),
                                                                                       00009
                                                                                       00010
             SAVEIALZI, SAVMUALZI, SAVMUFIZI, ZCVIZI, ZCPIZI, ZCTIZI,
                                                                                       00011
             ZCFA(Z), SAVVA(Z), TEXAVG, ETAAVG, XMUTAU, FARAVG, TAAVG, XMDTFD,
                                                                                       00012
             TEXT (100), SIMUTA(100), STMUTF(100), STA(100), STA(100), FANK(100), ETAS(100), DIFFLUC(100), ATR(100), ETAAVP, SAVLI(2),
                                                                                       00013
                                                                                       00014
             SAVLK (2), SAVXLS(2), SL1(160), SLK(100), SLS(100), SVFAL(100),
                                                                                       000 15
             FALAVG, TEXAVS, 1WT1(100), SLB(100), SAVXLB(2), 122(2)
                                                                                       00016
       DIMENSION KV(4)
                                                                                       00017
       DIMENSION NUPARM(20)
                                                                                       00018
       DIMENSION NAMELIZO, 31, NAMEZIZO, 3)
                                                                                       00019
       LUMPLEX AL (75.75)
                                                                                       00020
       DIMENSIUN CY (200) , AX (200) , PX (200)
                                                                                       00021
       DIMENSIUN
                                          AMPLUT (200,20), PHPLUT (200,20)
                                                                                       00022
       UIMENSIUN CXPLUT(200), PZPLUT(200,20)
                                                                                       00023
       DIMENSION SYM1(75), SYM2(75), SYM3(75), TITLE(20)
                                                                                       00024
       UIMENSIUN UMEGA (500)
                                                                                       00025
       DIMENSIUN CU (500). STITLE (19)
                                                                                       00026
        DIMENSIUN BANDISCECT
                                                                                       00027
       CUMMUN /KHUDW CK1(150)
                                                                                       00028
       DIMENSIUN BX (75), CX (75)
                                                                                       00024
       DIMENSION ICMBLICACO, ICMBLZCACO, SAVAMICAO, SAVAMZCAO),
                                                                                       00030
                   SAVPH1(40), SAVPH2(40), SVPHA1(40), SVPHA2(40)
                                                                                       00031
       DIMENSIUN ICYMI (40), ICYMZ (40)
                                                                                       00032
       DIMENSIUN WN(3), DW(3), WX(3), NPTS(3)
                                                                                       00033
       DIMENSIUN SAVCO(500)
                                                                                       00034
       DIMENSION TEMPCO(7), ITCY1(8), ITCY2(8)
                                                                                       00035
       DIMENSIUN PRASUP(20), AMPUP(20), AMPFAC(20), FREWUP(20), FRUFAC(20)
                                                                                       00036
       UIMENSIUN YMEN(26), YMACKS(20), INORM(20)
                                                                                       00037
C
       DIMENSIUN SCHR(Z)
                                                                                       00038
       CUMPLEX XVAL, DETERM
REAL NAME1, NAME2
                                                                                       00039
                                                                                       00040
       COMPLEX
                                                                                       00041
                    EX
       CUMPLEX
                                                                                       00042
                                                                                       00043
       CUMPLEX*16 BAND
       CUMPLEX
                   DUM
                                                                                       00044
       EWUIVALENCE (CRI(I).CX(1))
                                                                                       00045
       EWUIVALENCE (CPLUI, CY(1)), (AX(1), OMEGA(1)), (PX(1), CO(1))
                                                                                       00046
       DATA SYM1 / 4HP1 , 4HV1 , 4HR1 , 4HP2 , 4HV2 , 4HR2 , 4HP3H , 4HP3H , 4HR3H , 4HP2H ,
                                                                                       00047
                                                                                       00048
            4HV2H , 4HRZH , 4HU1N , 4HW3 , 4HW3H , 4HQUUT, 4HP4

4HV4 , 4HR4 , 4HP5 , 4HV5 , 4HK5 , 4HP6 , 4HV6

4HR6 , 4HP7 , 4HV7 , 4HR7 , 4HP8 , 4HV8 , 4HR0
                                                            4HQUUT, 4HP4 ,
                                                                                       00044
                                                                                       00050
                   , 4MP7 , 4MV7 , 4MR7 , 4MP8 , 4MV8 , 4MR0 , 4MV9 , 4MR9 , 4MP10 , 4MV10 , 4MK10 , 4MP11 ,
                                                                                       00051
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                                                                             10.0
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       4HV11 , 4HR11 , 32 * 4H
DATA SYMZ / 75 * 4H /
                                                                                            00053
                                     1
                                                                                            00054
       DATA SYM3 / 4H 1 , 4H 2 , 4H 3 , 4H 4 , 4H 5 , 4H 6 , 4H 7 , 4H 8 , 4H 9 , 4H10 , 4H11 , 4H12 , 4H13 ,
                                                                                            00055
                                                                                             00056
            4H14 , 4H15 , 4H16 , 4H17 , 4H18
                                                            , 4m19
                                                                       , 4H2U
                                                                                             00057
                                                                       , 4H27
            4H21 + 4H22 , 4H23 , 4H24 , 4H25
                                                             , 4n26
                                                                                             00058
       * 4H20 , 4H29 , 4H30 , 4H31 , 4H32 , 4H33

* 4H35 , 4H30 , 4H37 , 4H38 , 4H39 , 4H40

* 4H42 , 4H43 , 32 * 4H /

DATA XBL/* */
                                                                       , 4H34
                                                                                             00059
                                                                        · 4H41
                                                                                            00000
                                                                                             00001
                                                                                             00002
       DATA N / 43 /, 1ENTER / 0 /
                                                                                             00003
       IF (K1.GT.C .AND. IENTEK.GT.O) GU TU 160
                                                                                             00064
       IENTER = 1
DUM = (0.0,0.0)
                                                                                             00065
                                                                                             00000
       INITIALIZE ARKAYS
                                                                                             00067
   50 UU 60 1=1,75
BX(1) = 0.
                                                                                             60008
       CX(1)= C.
                                                                                             00070
       00 \ 00 \ J = 1, 75
AC(1,J) = 0.
                                                                                             00071
                                                                                             00072
   OF CUNTINUE
                                                                                             00073
       191 = 0
                                                                                            00074
       INND = -1.
                                                                                             00075
       IUNE =C
                                                                                             00016
       I CUUNT = U
                                                                                             01017
       IPLUT = 0
                                                                                             00078
       11 = 1
                                                                                             00019
                                                                                             00060
   70 READ(5,3446) (ITCY1(INQ),ITCY2(INQ),INQ=1,8)
                                                                                             00081
       00 80 1 = 1,0
                                                                                             00082
       IF ( ITCY1(1) .EQ. C .OK. ITCY2(1) .EQ. C ) GO TO 96
                                                                                             00003
       MU = MU + 1
                                                                                             00084
       1CMBL1(MU) = 1TCY1(1)
1CMBL2(MU) = 1TCY2(1)
                                                                                             00005
                                                                                             00086
    EL CONTINUE
                                                                                             00087
GU TU 70
3446 FURMAT ( 6(12, 1x, 12, 5x) )
                                                                                             38000
                                                                                             00089
   96 CUNTINUE
                                                                                             00040
  PLUT 10 PUT
160 197 = 197 + 1
                                                                                             00091
                                                                                             00042
       IF ( 1PT .GT. 20 ) 60 To 116
                                                                                             00043
      READ (5,5900) NUPARM(IPT), INDEM(IPT), AMPUP(IPT), PHASOP(IPT), FRUPAC(IPT), FRUPAC(IPT), YMEN(IPT), YMACKS(IPT) IF (NUPARM(IPT) .EQ. 6 ) GO TO 110
                                                                                             CCC54
                                                                                             00045
                                                                                             00046
       GU TU 100
                                                                                             00097
  110 IF (IFT .EW. 1 ) GO TO 120
                                                                                             00098
       NUGUUL = 6
                                                                                             00099
       1PT = 1PT - 1
GU TG 130
                                                                                             66160
                                                                                             ccici
  126 NUGUUL = 1
                                                                                             00132
  136 CUNTINUE
                                                                                             00163
       KEAU_35,33331 (WN(14), DW(14), WX(14), I_{4}=1,3) DU 138 K_{4}=1,3
                                                                                             00104
                                                                                             00105
```

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1F (DW(KU).EU.O.) GU TO 138		00106		
$NPTS(KU) = \{WX(KU) - WN(KU)\}/DW(KU) + 1$		00107		
138 CUNTINUE		06106		
LL = 0		00109		
140 KEAD (5,201) (TEMPCO(1), 1 = 1, 7)		00110		
DU 160 LL4 = 1, /		00111		
IF (TEMPLUILLE) .EQ. INND) GO TO 176		00112		
LL = LL + 1		00113		
IF ( LL .LT. 500 ) GO TO 150		00114		
WKITE(6,2341)		00115		
GU TU 810		00116		
150 SAVOULLE = TEMPOULLE		00117		
100 CUNTINUE		00118		
6U TU 140		00119		
170 CUNTINUE		00170		
KEAU (5,201) KMAG, ETMIN, BIMAX, BTUEL		06121		
BIMIN = BIMIN / 57.24570		00122		
61MAX = 6TMAX / 57.29576		00123		
BIDEL = BIDEL / 57.29578		06124		
RMAG = RMAG * 6.28318		00125		
IBETA = 0		00126		
ISVLL = LL		00121		
KASE = 0		00128		
180 CUNTINUE		00129		
IBETA = 0		00130		
IFIKST = 6		00131		
KV(1) = K1		00132		
KASE = KASE + 1		00133		
1F (KASE .LE.10) GU TU 200 WKITE(6,2020)		00134		
GU 10 810		0C135 00136		
200 CUNTINUE		00137		
21C CONTINUE		00138		
IFLEG = 0		0(139		
100 = 1		00140		
226 1F (DW(199) .EQ. 0. ) GU TO 700		00141		
14 = 0		00142		
10 = -1		00143		
230 12 = 12 + 1		00144		
IF ( 12 .6T. 500 ) 60 10 250		00145		
10 = 10 + 1		0(146		
VALUE = WN(100) + 10 * DW(100)		06147		
TUL = .1 * DW(194)		C0148		
1F (VALUE - (WX(144) + TUL) ) 240, 240, 250		66144		
240 CU(1Z) = VALUE		00150		
GU TU 230		00151		
250 LL = 1Z - 1		06152		
CUPMAX = CU(LL)		00153		
200 DU 696 IM = II, LL		00154		
UMEGA(IM)=CU(IM)* 6.28318		00155		
C CUNSTANT 6.26316 15 2.*3.14159		00156		
CAL MAZELY ELEMENZS REAM SUBGRIDITAE TROUT		00157		
C GET MATRIX ELEMENTS FRUM SUBRUUTINE INPUT		00156		

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C		- 00159		
Ir (1/2(1).Eu.1.UK.1/2(2).Eu.1) WKITE (0,1	0101)	00160		
10101 FURMAT ( *** WAKNING *** THE FLAMEHOLDER	CUMBUSTION MUDEL CASE	1A00161		
IS FAILED FUR AT LEAST ONE STREAMTUBE. 1/1	THE KUMBLE MUDEL CA	SE00102		
Z HAS NUT BEEN EXECUTED. 1)		00163		
1F (122(1).Eu.1.UK.1/2(2).Eu.1) KETUKN		00164		
LALL INPUT' (AL, EX, UMEGA (IM), KASE, KV, IFIRST	)	00165		
N2 = N+N		00166		
11 = 0		00167		
C CALCULATE NUMBER OF SUB AND SUPER DIAGONAL	5	00168		
CALL BANDLX (N. 75, AC, BAND, NSUP, NSUB)		00169		
NSS = NSUF + 1		00170		
NS = NSUB		00171		
IBAN= U		00172		
152 = 1				
		00173		
1552= 1		00174		
C SETUP SINGLE SUPSCRIPT BAND MATRIX ARRAY		00176		
C		- 00177		
280 IF INS .LE. 01 GU TU 300		00178		
DU 296 1 = 1,NS		001/9		
IDAN= IDAN+1		06180		
290 BANU(16AN) = 0.		00161		
30C CUNTINUE		00162		
DU 310 J = 1552, NSS		00103		
1+ (J .6T. N1 GO TU 320		06184		
IBAN = IBAN+1		00185		
31C BAND(IBAN) = AC(152.J)		00100		
60 TU 340		00187		
320 DU 330 JU = J. NSS		00166		
10AN=10AN+1		00189		
330 BANU(10AN) = 0.		CC190		
340 152 = 154+1		00191		
NS = NS-1		00172		
NSS= NSS+1		00193		
1F (152 .6T. NSUB+1) 1552 = 1552+1		00194		
1r (152 .Lt. N) GU TU 280		00175		
KMAGVL = KMAG / 6.28316				
		00146		
BETVAL = UMEGA(1M) * 57.29518		00197		
IF ( IEETA .Ev. 1 ) WHITE (C,Z100) KMAGVL,		00148		
C SULVE BANG MATRIX		00200		
C				
lerr = 0		00202		
CALL DMAT (NSUP, NSUD, N, DAND, LEKK)		00203		
CALL SULBAN INSUP, NSUE, N, BAND, DX , CX)		00204		
IF I NUGLUL .NE. C) 66 TO 460		00205		
IF ( IPLUT .NE. 0 ) 60 10 400		00206		
36( ICUUNT = 1CUUNT + 1		10200		
1 + (1000NT .LT. 200) 60 TO 390		00208		
WKITc(6,6013)		00209		
6013 FURMAT ( 10x, "ICCUNT GREATER THAN LOU" )		00210		
IPLUT = 1		00211		

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                                                                                                    91
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  GU TU 400
34° CAPLUT (ICOUNT) = CU(IM)
                                                                                  00212
                                                                                  00213
  460 11 = 6
                                                                                  00214
                                                 C -----
     CALCUALTE AND PRINT AMP, REAL AND IMAG PART, ETC. FOR UNKNOWNS
                                                                                  00216
                                                                                 - OCZ17
       DU 010 1=1,N2,Z
                                                                                  00218
       1 EMP = 0.
                                                                                  00219
       11 = 11+1
                                                                                  00220
      CXR = CK1(1)* CK1(1)
CXI = CK1(1+1)*CK1(1+1)
                                                                                  00221
                                                                                  00222
      AMP = SURT(CXR+CX1)
IF (AMP'.NE. 0.) GU TU 420
                                                                                  00223
                                                                                  002.4
       AL = -1.0E+70
                                                                                  OLLES
       ALZ = -1.0E+70
                                                                                  00226
       60 TU 456
                                                                                  00227
       CUNSTAIT 8.68589 = 20./2.302585
                                                                                  00228
  426 AL = ALUGIAMFI * 8.06589
                                                                                  002.9
      ALZ= AL/20 .
                                                                                  00230
                                                                                  00231
  430 IF (CKI(1) .NE. 0.) GU TU 440
      IF (CRI(I+1) .GT. 0) IEMP = 90.
IF ( CRI(I+1) .LT. 0) TEMP = 270.
                                                                                  00232
                                                                                  00233
       60 10 476
                                                                                  00234
  440 CICK = ABS(CRI(1+1)/CRI(1))
TEMP = ATAN(CICK) * 57.3
IF (CRI(1) .LT. 0.) GU IC 490
                                                                                  002 35
                                                                                  00236
                                                                                  00237
       IF (CKI(1+1).LT.C.) GU TO 480
                                                                                  00238
  470 X1 = 1EMP-366.
                                                                                  00239
  60 TO 520
480 XI = -TEMP
                                                                                  00240
                                                                                  00241
       60 10 52C
                                                                                  00242
  490 IF (CKI(1+1).LT.O.) GU TU 510
                                                                                  00243
      X1 = -1 EMP - 180.
                                                                                  06244
       GU TO 520
                                                                                  00245
  510 X1 = TEMP - 180.
520 X12 = X1
                                                                                  00246
                                                                                  00241
       IF(ABS(X121.61.180) X12=X12 + 300.
                                                                                  00248
                                                                                  00244
       CUP = CU(IM)
       CUPMAX = CU(LL)
                                                                                  00250
       CALL PRNTSV (SYM1, SYM2, SYM3, AMP, X1, COP, COPMAX)
                                                                                  00251
       IF ( MQ .EQ. 0 / GO TO 550
                                                                                  00252
       DU 540 JU = 1, MU
IF ( IUMBELLUM) .NE. II ) GU TU 530
SAVAMI(JU) = AMP
                                                                                  00253
                                                                                  00254
                                                                                  00255
       SAVPHI (JU) = X1
                                                                                  00256
       SVPHALIJUI = X12
                                                                                  00257
        11 = 1001 IMYJ1
                                                                                  00258
       6U TU 540
                                                                                  00254
  530 IF ( ICMBLZ(JW) .NE. II ) 60 TO 540
                                                                                  00260
       SAVAME (JU) = AMP
                                                                                   00261
       SAVPHZIJUJ = X1
                                                                                  00262
       SVPHAZ (JU) = X12
                                                                                  00263
```

00264

164M2(Ju) = 11

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  540 CUNTINUE
                                                                                              00265
  550 CONTINUE
                                                                                              00266
       STORE PLOT INFORMATION FOR THE UNKNOWNS
                                                                                              00267
       IF ( NOGULL .NE. 0 ) GU TU 600
IF ( IPLUT .NE. 0 ) GU TU 600
UU 560 IPAR = 1, IPT
IPA = NUPARM(IPAR)
IF ( II . EU. IPA ) GU TU 570
                                                                                              00268
                                                                                              00269
                                                                                              00270
                                                                                              00271
                                                                                              00272
  560 CUNTINUE
                                                                                              00273
       60 TU 600
                                                                                              00274
  576 AMPLUT (ICUUNT, IPAR) = AMP
                                                                                              00275
       NAMEL(LPAR,1) = SYMI(IPA )
NAMEL(IPAR,2) = SYMZ(IPA )
                                                                                              00277
       NAMEL (IPAK, 3) = SYMS(IPA )
                                                                                              00278
       NAMEZ(IPAR,1) = XBL
                                                                                              00279
       NAME 2 (IPAK, 2) = XBL
                                                                                              00280
       NAMEZ(IPAR,3) = XBL
                                                                                              00281
  596 PHPLUTICUUNT, IPAR | = X1
                                                                                              00282
       PZPLUT(ICOUNT, IPAR) = X12
                                                                                              00283
  600 CUNTINUE
                                                                                              00284
  610 CUNTINUE
                                                                                              00285
  620 CUNTINUL
                                                                                              00286
                                                                                              00287
       GENERATE ST / SZ TYPE UUTPUT
                                                                                              00288
C --
       1F ( Mw .Ew. 0 ) 60 Tu 680
                                                                                              00290
       JNJ = JU + 160
                                                                                              00291
                                                                                              00292
       AMPAMY = SAVAMI(JQ) / SAVAM2(JQ)
XLG20 = -1.CE+70
                                                                                              00293
                                                                                              00294
       IF ( AMPAMP .NE. G.G )
      IXLGZO = ALUG(AMPAMP) * d.66589
FAZE1 = SAVPHI(JQ) - SAVPHI(JQ)
                                                                                              00296
                                                                                              00297
       XLUAM = -1.CE+70
                                                                                              00298
        IF ( AMPAMP .NE. O.C )
                                                                                              00244
       IXLUAM = XLG20 / 24.
                                                                                              00300
        IF ( FAZEL .GT. 0) FAZEL = -300. + FAZEL
                                                                                              00301
       FAZEZ = FAZE1
                                                                                              00302
       IF ( ABSTRACE1) .GT. 186.) FAZEZ = FAZE1 + 36C.
REEL = AMPAMP * CUSTRACE1 / 57.295)

XIMG = AMPAMP * SIN(FAZE1/ 57.295)
                                                                                              00303
                                                                                              00304
                                                                                              00305
        IKM = ICYMILJU)
                                                                                              00306
       IKMZ= ILYMZ(JU)
       CALL PROTE (SYMI, SYMZ, SYM3, ICYMI, ICYM Z, AMPAMP, FAZEI, CUP, CUPMAX, MW 100308
       STURE PLUT INFURMATION FOR SI / SZ TYPE TERMS

IF ( NOGOUL .NE. C ) GO TU 670

IF ( IPLUT .NE. C ) GU TU 670

DU 630 IPAR = 1, IPT
                                                                                              00309
                                                                                              00310
                                                                                              00311
                                                                                              00312
        IPA = NUPAKM (IPAR)
                                                                                              00313
        IF (JNJ . EW. 144 ) 60 TU 646
                                                                                              00314
  636 CUNTINUE
                                                                                              0(315
  GU TU 670
640 AMPLUI(ICUUNT, IPAK) = AMPAMP
                                                                                              00310
                                                                                              00317
```

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        NAME 1 ( IPAK , 1 ) = SYM1 ( IRM )
                                                                                                00318
        NAMEL (IPAK, 2) = SYMZ(IRM)
                                                                                                00319
        NAME ( ( IPAK , ) = SYM3 ( IRM )
NAME 2 ( IPAK , 1 ) = SYM1 ( IRM 2 )
                                                                                                00320
                                                                                                00321
        NAMEZ ( IPAK , 2 ) = SYMZ( IKMZ)
                                                                                                00322
        NAMEZIIPAR,3) = SYM3(IRMZ)
                                                                                                00323
        PHPLUT(ILGUNT, 1PAK) = FAZE1
PZPLUT(ILGUNT, 1PAK) = FAZE2
                                                                                                0(324
                                                                                                00325
  670 CONTINUE
                                                                                                00326
  GEC CUNTINUE
                                                                                                00327
C ---
                                                                                          ---- 00328
       DETERMINANT BUTPUT
                                                                                                003/4
                                                                                                00330
        DU 5250 Ju=1,2
        XVAL = DETERM
                                                                                                00332
        IF ( JQ .EQ. Z ) XVAL = DETERM + ( 1., 0. )
                                                                                                00333
        JNJ = 149 + JE
REALDT = REAL ( XVAL )
                                                                                                00334
                                                                                                00335
       CMPLUT = AIMAG ( XVAL )

AMP = SURT ( REALUT**2 + CMPLUT**2 )
                                                                                                00336
                                                                                                00337
        IF (AMP .NE. U.) GU TU 4266
                                                                                                00338
        AL = -1.0E+70
AL2 = -1.0E+70
                                                                                                00339
                                                                                                00340
        60 TO 4360
                                                                                                00341
 CUNSTANT 8.68509 = 20./2.302585
                                                                                                00342
                                                                                                00343
        ALZ= AL/20.
 4300 IF (REALUT .NE. 0.) GU 10 4400
                                                                                                96345
       1F ( CMPLDT .61. 0) TEMP = 90.
1F ( CMPLDT .LT. 0) TEMP = 270.
                                                                                                00346
                                                                                                00347
        GU TO 4700
                                                                                                00348
 4400 CICK = ABS(CMPLOT/REALDI)
TEMP = ATAN(CICK) * 57.5
IF (REALDT .LT. C.) GU TU 4900
4600 IF ( CMPLOT .LT.O.) GU TU 4800
4700 X1 = TEMP-360.
                                                                                                00349
                                                                                                00350
                                                                                                00351
                                                                                                00352
                                                                                                00353
 60 10 5200
4800 Y.1 = -TEMP
                                                                                                00354
                                                                                                00355
        60 10 5200
                                                                                                00356
 4900 IF ( CMPLDT .LT.O.) GO TO 5100 X1 = -TEMP - 180.
                                                                                                00357
                                                                                                00358
        60 10 5200
                                                                                                00359
 5100 X1 = 1EMP - 180.
5200 X12 = X1
                                                                                                00360
                                                                                                00361
        1+(ABS(X12).GT.180) X12=X12 + 360.
                                                                                                00362
        DETERMINANT PLUT INFURMATION
                                                                                                00363
        IF ( NOGUUL .NE. 0 ) GO TU 5250

IF ( IPLUT .NE. 0 ) GO TU 5250

DU 6360 IPAR = 1,1PT
                                                                                                00364
                                                                                                00365
                                                                                                00366
        IPA = NUPARM(IPAR)
                                                                                                00367
        IF ( IPA .NE. JNJ ) GU 10 6300
                                                                                                00368
        AMPLUT (ICUUNI, IPAK) = AMP
                                                                                                00369
        NAMELITERAL = XBL
                                                                                                00370
```

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       NAME 1 (1PAR, 2) = XBL
                                                                                        00371
       NAME 1 (1PAK, 3) = XLAB
                                                                                        00372
       NAMEZ(1PAK,1) = XbL
                                                                                        00373
       NAMEZ(IPAK,2) = XBL
                                                                                        00374
       NAMEZ(IPAR,3) = XBL
                                                                                        00375
       PHPLUT (ICUUNT, IPAR) = X1
                                                                                        00376
       P2PLUT (ICUUNT, IPAK) = X12
                                                                                        00377
 630C CONTINUE
                                                                                        00378
 5250 CONTINUE
                                                                                        00374
       IF ( 1ERK .EQ. 1 ) 60 TU 790
                                                                                        00380
  690 CUNTINUE V
                                                                                        00381
  IF ( 18ETA .EU. 1 ) GU TU 7475
70C IF ( 144 .GE. 3 ) GO TU 710
                                                                                        00302
                                                                                        00363
       100 = 100 + 1
                                                                                        00304
  GU TO 220
710 IF ( IFLEG .EQ. 1 ) GU TO 730
                                                                                        06385
                                                                                        00386
       IFLEG = 1
                                                                                        00367
  1F ( 15VLL .Eq. 0 ) GU TU 730
OU 726 IZ = 1, 15VLL
720 CU(1Z) = SAVCU(1Z)
                                                                                        00388
                                                                                        06389
                                                                                        00340
       LL = 15VLL
                                                                                        00341
      CUPMAX = CU(ISVLL)
GU TO 200
                                                                                        00342
                                                                                        00343
  730 CUNTINUE
                                                                                        00394
       IF ( bTDEL .EW. 0. ) GO TO 7500
                                                                                        00355
      1BETA = 1
NGGOUL = NOGUUL
NUGUUL = 1
                                                                                        00346
                                                                                        00397
                                                                                        06348
       11 = 1
                                                                                        00344
       LL =
             ABS ( BTMAX - BTMIN ) / BTDEL ) + 1.001
                                                                                        C0400
       DO 7300 1=1,LL
                                                                                        00401
 73^0 CU(1) = ( BTMIN + (1-1) * BTUEL ) / 6.28318
GU TO 260
7475 NUGUUL = NGGCUL
                                                                                        00402
                                                                                        00403
                                                                                        00404
 7500 CUNTINUE
                                                                                        00405
                                                                                        00466
       GENERATE CALCUMP PLUTS
                                                                                        00407
                                                                                        00408
       IF (NUGUUL .NE. C) 60 TU 790
                                                                                        00409
       1F ( 1PLUT .NE. 0 ) 1CUUNT = \angle00 DO 78G I = 1, IPT
                                                                                        00410
                                                                                        0(411
       16 = 1
                                                                                        00412
       DU 770 J = 1, 1COUNT
CY(J) = CXPLUT(J)
AX(J) = AMPLOT(J,1)
                                                                                        00413
                                                                                        00414
                                                                                        00415
       IF (PHASUP(1) .EV. 0) GO TO 750
PX(J) = P2PLOT(J,1)
                                                                                        01416
                                                                                        0(417
       GU TU 760
                                                                                        06418
  75C PX(J) = PHPLOT(J,1)
                                                                                        00414
  760 CONTINUE
                                                                                        00420
  77" CONTINUE
                                                                                        00421
      CALL PLUTGICY, PX, AX, 1 COUNT, FREQUP(1), FRUFAC(1), PHASUP(1),
                                                                                        00422
            AMPUF(I), AMPFAC(I), 1G, YMEN(I), YMACKS(I), INUKM(I) )
                                                                                        00423
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CSG. PAN757	10.0	11.35.62	96	021269
780 CONTINUE		00424		
740 CUNTINUE		00425		
LL = C		00466		
IPLUT = 0		00427		
1 COUNT = C		00428		
810 RETURN		00424		
201 FURMAT ( 7F10.0)		00430		
2160 FURMAT (T30, "MAGNITUDE =", F10.4,5x, "BETA", F10.4)		00451		
5900 FURMAT (13, 11, 6x, 7F10.0)		00432		
3333 FURMAT ( 3F10.0)		00433		
2341 FURMAT (/ TIO, 10(***), "YOU HAVE EXCEEDED THE MAXIM	UM ALLUWA	BLE *00434		
I, "NUMBER OF UMEGAS - PROGRAM WILL BE TERMINATED"	, / )	00435		
2020 FURMAT (T5, "YOU HAVE EXCEEDED MAXIMUM NO. UF CASES A	LLUWED .	/ 00436		
1 T10, PROGRAM WILL BE TERMINATED ! )		00457		
ENO		00438		

PRATT AND WHITNEY AIRCRAFT GROUP WEST PALM BEACH FL G--ETC F/G 21/2 LO-FREQUENCY AUGMENTOR INSTABILITY INVESTIGATION COMPUTER PROGR--ETC(U) AD-A065 774 DEC 78 P L RUSSELL, 6 BRANT, R ERNST PWA-FR-9797 AFAPI F33615-76-C-2024 UNCLASSIFIED AFAPL-TR-78-83 NL 3 OF 4 AD AO 65774

PRAIT & WHIINEY AIRCRAFT ULVISIUN CSG.PAN757	VEK 10.0	12/07/78	PAGE 97	SEKIAL GZ1269
C DATA SET BEBUSETUP AT LEVEL DOL AS OF 12/07/	76 E33			
SUBROUTINE SETUPLINDEX, 1PASS)		00001		
REAL LSCOLSHOMOCOMOHOLAGEBOLLOCHOLLOCKOLZOMOR		00002		
CUMMON /CINPT/FHW, PFSK, PS, TFSK, JFUEL, VA, TA, XF, TAU,	ALPHA, FAK	00003		
X,XL,EPS,CDFH,FARMB,1STRM,WEXT,TEXT		00004		
CUMMUN /AUGIN/ JFUELI, NAUGUP, NCUMUP, NFSUP, NPRNTK, N		00005		
CUMMUN /FLAMIN/ ALPHAC(100), ALPHAH(100), FAC(100), F		00006		
* FHMC(100), FHMH(100), LSL(100), LSH(100), NSC(100), NS		00007		
* PFSRI(100), TAUC(10C), TAUH(10C), TEXTI(100), TFSRI(1	061, T6C(100)			
* Ton(100), MEXT1(100), XLC(100), XLm(100), NTC, NTm		00009		
CUMMUN/RMbLIN/BPR, DPCS, DPD, DPH, DPHS, DPS, EPSC, EPSH,				
* FA, FAV, LA, LB, LC, LH, L1, LK, L2, MOC, MOH, MOK, PRNUZ, PSO	, T3H, ZEF, LEF	00011		
* ZEFH, ZEFY, ZEP, ZEPC, ZEPH, ZETC, ZETH, ZEVC, ZEVH, TLUKE		00012		
CUMMON /GTPUT/ MDUTA, MOUTE, MDFFLO, MOTEVO, DETA1, b2,	DL(5),61(5),	00013		
XTLF(5),MOTFC,K1,PS1,TLFEX,B3,TW, ETAFH		00014		
X, DLU(5), B1E, DMDTU, BDC, RTVD, DQBUTU, Y, SLU, EPSO, VU, XO	. EPSXO, ETAG	00015		
X,STO,X1(100),EPSX1(100),S11(100),ETA(100),NSTEP,TA	EFF	00010		
CUMMUN /MISC/ RHUA, MUA, ADUCT, PI, LDC, FHWTMP, B1 T, KM,	THO, DEFISI	00017		
X, DETAZ ()), ETAW, MOTHLI, TLC, MOUTFL(5), FAKW, STOAK, FAK	E	00018		
CUMMUN /CKVS/ CRVMUA(44), CRVKM(44), CR VLAM(22), CKVP	V (24)	00019		
X,CRVSL(36),CKVPK(30),TKJP+ (283),CKVTSL(20)		00020		
X,CKVCF1(20),CKVPT(20),CKVPTK(24),CKVSLE(10),CKVEVP	(161. LKVTSPI)	161 00021		
G = 32.2		00022		
WAR = 0.0		00023		
P5=P56		00024		
Jrutl = Jrutl		00025		
PFSK=PFSK1(INUEX)		00046		
IFSK=IFSKI(INDEX)		00027		
CDFH=1.4		00028		
IFCASTEM .GT. OF GU TU AGU		00029		
FHW=FHWC(INDEX)		00030		
TA=TOC (INUEX)		00031		
XF=LSC(INDEX)		06034		
TAU=TAUC (INDEX)		00033		
ALPHA=ALPHAL (INCEX)		00034		
FAK=FAC(INDEX)		00005		
XL=XLC(INUEA)		00036		
EPS=EPSC		7 د 000		
FAKMB=(.		00038		
MEXI=MEXII(INDEX)		00037		
TEXT=TEXT1(INDEX)		06040		
CALL GASTADI 10, TA, FAK, K, WAK)		00041		
CALL GASTADISO, TA, FAK, GAMA, WAK)		0(042		
VA = 341T (GAMA * K * (TA+460.) * G) * MOL		00043		
GU 1U 200		00044		
10( FHW=FHWH(INDEX)		00045		
TA=Tom(INDEX)		90040		
AF=LSH(INDEX)		00043		
TAU=TAUH(INDEX)		00048		
ALPHA=ALPHAH(INDEX)		00049		
FAK=FAN(INDEX)		00050		
XL=XLH(INDEX)		00051		
EPS=EPSH		00052		
tra-tran		0.052		

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CSG. PAN'157	10.6	11.33.62	98	021267
FARMB= FAV		00053		
MEXI=MEXII (INDEX)		00054		
1EXT=1EXT1(INDEX)		00055		
LALL GASTABILC, TA, FAK, K, WAK)		00000		
CALL GASTAB(36, TA, FAR, GAMA, WAK)		00057		
VA = SURTIGAMA *K * (TA + 400.) * 6) * MOH		00058		
200 GU TU 11000,300,400,500,6001,1PASS		00059		
30C VA = VA * .99		00060		
GU TU 1000		00061		
400 PS = PS * 1.01		00002		
GU TU 1000		00063		
500 FAR = FAK * .44		00064		
GU TU 1000		00005		
600 TA = 1.01 * (TA + 400.) - 400.		00006		
1000 KETURN		00067		
END		OGGnR		

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C
              DATA SET BEBUSLVETA AT LEVEL OOL AS OF 12/07/76 E33
       SUBKUUTINE SLVETA(KU)
                                                                                             00001
       KEAL MOUTA, MOUTE, MOTELO, MUTEVO, MOTEL1, MUTEC, MUUTEL
                                                                                             00002
                                                                                              00003
       LUMMUN /CINPT/FHH, PrSk, PS, TrSk, Jfuel, VA, TA, XF, TAU, ALPHA, FAR
                                                                                              00064
      X, XL, EPS, LUFH, FARMB, ISTRM, WEAT, TEAT
                                                                                             OCOL5
      CUMMON /UTPUT/ MUUTA, MUCTF, MUTFLO, MDTFYO, BETA1, B2, DL(5), B1(5), XTLF(5), MDTFC, K1, PS1, TLFEX, B3, TW, ETAFM A, ULU(5), B1E, UMQTO, BUC, RTVO, UMUUTU, Y, SLU, EPSO, VO, XG, EPSXO, ETAG
                                                                                             00006
                                                                                             00007
                                                                                             00008
      X, STO, X1(100), EPSX1(100), ST1(100), ETA(100), NSTEP, TAEFF
                                                                                             00009
       CUMMUN /MISC/ RHOA, MUA, ADUCI, PI, LUC, FINTMP, BIT, KM, TFO, DLF (5)
                                                                                             00010
      X, BETAZ (51, ETAM, MOTFLE, TLC, MUUTFL(5), FARM, STBAK, FARE
                                                                                             00011
       CUMMUN /CKVS/ CKVMUA(44),CKVKM(44),CKVLAM(22),CKVPV(24)
                                                                                             00012
      A,CKVSL(30),CKVPTK(3C),TKJP4 (203),CKVTSL(20)

A,CKVSL(30),CKVPTK(20),CKVPTK(24),CKVSLE(10),CKVEVP(16),CKVTSP(10)

DIMENSIUN TWW(41), FAKHH(41), FAKHB(2C), TWD(2O),

TAB3(44),B3MB(2O)

OGGIO
       CUMMUN /TAB/ TABLEBOT, TABLE44)
                                                                                             00017
       EXTERNAL FATHPL FATHPL
                                                                                             00018
       NU = U
                                                                                             00019
       IV = Q
                                                                                             00020
       1VK1 = 6
                                                                                             00021
       ICNT = C
                                                                                              00022
                                                                                             00023
       UX = . (045
       FARM = .02
                                                                                              00024
                                                                                             00025
      TAEFF = ((TEXT + WEXT) + TA) / (1. + WEXT)
PSI = (1. + WEXT) + PSI
CALL WARE (K,UTFI)
DIF1 = UTF1 + 1.8
                                                                                             00026
                                                                                             00627
                                                                                             00028
                                                                                              00024
       1 - IK . 61. 6160 Tu 9
                                                                                              00030
       IFIICNT . GE. 40160 TO 7
                                                                                             06001
        ILNT = ICNT+1
                                                                                             00032
        TANLICATE = TARFF + DTF1 + ETAN
                                                                                             00033
       FARWWIICHT) = FARW
                                                                                             00034
       WKILELO, YSELL, LCNT, TACFF, UTFL, ETAW, [WW(LCNT), FAKWW(LCNT)
                                                                                             00035
  958 FURMAT (215,5815.7)
                                                                                              00036
       60 TO 6
                                                                                             00037
     4 IFLICAT .GT. UIGO TO E
                                                                                             00038
     & FARM - FARM + DX
                                                                                             00034
       K = C
                                                                                             00040
       IFILEND .E. LIGO TO 7
                                                                                              00041
       60 10 1c
                                                                                              00042
     B FARW = FARW - . 0005
                                                                                             00043
                                                                                             00044
       N = 0
                                                                                             000-5
       60 10 10
                                                                                             00046
     7 TH = 1000
                                                                                             60647
       UA = 200
                                                                                              00048
       DU 20 1=1,20
                                                                                             00044
       CALL DETAS

FARMB(1) = FAR + (DETAL + (1.-DETAL) + 62 + 65/KL)

THE(1) = Tw
                                                                                             00050
                                                                                             00051
                                                                                             00052
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PRATT & WHITNEY AIRCRAFT DIVISION
                                                                               VER
                                                                                               12/01/18
                                                                                                                   PAGE
                                                                                                                                SEKIAL
CSG.PAN757
                                                                                               11.33.02
                                                                                                                    100
                                                                                                                                021269
       1+(1 .Eu. 1)GO TO 12
1+ (+AKMB(1) - FAKMB(1-1))11,11,12
                                                                                               00054
                                                                                               00054
   11 1-(14)13,13,12
                                                                                               00055
       1VKT = 1 - 1
                                                                                                00057
   12 CUNTINUE
                                                                                                00058
C 12 WKITE(0, 797)1, FAK, DETA1, DZ, D3, K1, TW, FAKWB(1)
977 FURMAI(15, 7612.4)
                                                                                               00054
                                                                                                00000
      53ML (11) = 63
                                                                                               00061
        TW = IN + UX
                                                                                                00002
   2C CUNTINUE
                                                                                                00063
  999 FURMAT (15, 4F12.4)
                                                                                                00004
C DU \ge 0 I = 1,1CNT
C \ge 0 mkITE (0,999)1, FARMW(1), TWW(1), FARMB(1), TWD(1)
                                                                                                00065
                                                                                               00066
        TABL(1) = 1.
TABL(2) = 3.
                                                                                                00007
                                                                                                00068
        TABLES = FLUAT (ILNT)
                                                                                                00004
       TAB1(4) = 0.0
                                                                                                00070
        DU 30 1=1,1CNT
                                                                                               00071
   TAB1(1 + 4) = FARWW(1)

30 TAB1(1 + 4 + 1CNT) = 1WW(1)

TAB3(1) = 1.

TAB3(2) = 3.
                                                                                                00072
                                                                                                00073
                                                                                                00074
                                                                                                00075
        TAB3(3) = 20.
                                                                                                00076
       TAB3(4) = 0.
DO 4C 1 = 1,20
                                                                                                00017
                                                                                               00078
        TAB3(1+4) = TWE(1)
                                                                                               C0079
    40 TAB3(1+24) = B3WB(1)
                                                                                                60000
        NN = 20
                                                                                                00001
        IF (IVKT .GT. C)NN = IVKI
                                                                                                00062
       TAB2(1) = 1.

TAB2(2) = 3.

TAB2(3) = FLUAT(NN)

TAB2(4) = 0.
                                                                                                00083
                                                                                               00084
                                                                                                00005
                                                                                               000 86
       DU 42 I = 1, NN
TABZ(1 + 4) = FAKWB(1)
                                                                                                00087
                                                                                                00008
    42 TAB2(1+4+NN) = 1WB(1)
                                                                                                00089
       1F(1VKT .LE. 0)60 TU 41
                                                                                                00040
        X = FARWB(IVKT)
                                                                                               00041
        CALL UNBAR (TAB1, 1, X, 0, Y2, 15)
IF(15 .GT. 0) GU TU 41
                                                                                               00072
                                                                                                00093
        Y1 = Y2
                                                                                                00094
        IFIYZ .GE. TWB(IVRT)) GU TU 70
                                                                                                00045
    41 KJ = 0
                                                                                                00046
       X = FARWWILLICAT)
                                                                                               00097
        CALL UNBAR(TAB1,1,x,G.,YL1,15)
CALL UNBAR(TAB2,1,x,G.,YL2,15)
IF(YL2 .LT. YL1)GU TU 60
                                                                                                00048
                                                                                               00077
                                                                                               00100
        XLL = FARWW(1)
                                                                                                00101
        XK = FARWB (NN)
                                                                                               00102
    CALL REGULA (ALL, XR, FATMP1, FATMP2, KJ, X, Y1, 1EK)
1F(1EK .GT. G)GU TU 60
76 Tw = Y1
                                                                                               06103
                                                                                               00104
                                                                                               00105
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PRATT & WHITNEY	AIRCRAFT DIVISIUN	VER 10.0	12/07/78	PAGE 101	SER1AL 021269
					OLILO,
FARW = X			00106		
C CURVE IS TH	IE SAME FUR JP4 AND JP5		00107		
CALL UNBA	RITRJP4, 1, FARW, TA, DTF1, ISI		00108		
ETAW = (1	W-TAI/DTF1		00109		
CALL UNBA	R(TAB3, 1, TW, 0., 83, 15)		06110		
GU TU 80			00111		
C 60 WKITE to	161)		00112		
C 101 FORMAT (	MAKE TEMPERATURE ITERATION FAILED!)		00113		
60 KU = 1			00114		
80 RETURN			00115		
END			00116		

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12/07/78
PRATT & WHITNEY AIRCRAFT DIVISION
                                                                        VEK
                                                                                                     PAGE
                                                                                                                 SEKIAL
                                                                      16.0
CSG.PAN757
                                                                                    11.33.62
                                                                                                       102
            DATA SET B28DSULBAN AT LEVEL GOT AS UF 12/07/76 DATA SET 8458SULBAN AT LEVEL GOT AS UF 12/22/77
                                                                      £33
                                                                                     00001
       SULBAN
                                                                                     OCCCZ
       SUBRUCTINE SULBAN INP, NB, NK, BANU, D, XX)
       CUMPLEX#16 BAND
                                                                                     00004
       CUMPLEX BA XX
                                                                                     00005
       COMPLEXA 10 X
                                                                                     00006
       CUMPLEX DETERM
                                                                                     00007
      CUMPLEX*16 5,60,04
                                                                                     00008
       UIMENSIUN BAND(1), B(1), X(75), XX(1)
                                                                                     00009
                                                                                     06010
       CUMMUN /UTRM/ KMAG, STMIN, STMAX, STDEL, DETERM, IBETA
       BAND MATRIX SULUTION
                                                                                     000.1
       SULVING THE DECUMPOSED BAND MATRIX, GIVEN A CULUMN VECTUR B.
                                                                                     00012
C
       THE DECUMPUSED BAND MATRIX IS UBTAINED FROM SUBROUTINE BMAT AND SIGCOLS
       IN AKKAY BAND.
                                                                                     90014
       THAT IS, SULVE (LU)X = 6 FUK A, FUR A GIVEN 6.
                                                                                     00015
       VARIABLE DICTIONARY FOR ARGUMENT LIST
                                                                                     00016
      NP = NU. UF SUPERDIAGUNALS IN BAND MATRIX
ND = NU. UF SUBDIAGUNALS IN BAND MATRIX
NK = NU. UF KUWS IN BAND MATRIX
BAND(1)= ARRAY CUNTAINING THE DECUMPUSED BAND ELEMENTS.
                                                                                     06617
                                                                                     00018
                                                                                     00019
                                                                                     00020
       B(1) = CULUMN VECTUR IN MATRIX EQUATION (BAND) X = B
                                                                                     00021
       X(I) = SOLUTION VECTOR FOR ABOVE MENTIUNED MATRIX EQUATION.
                                                                                     00022
       NC = NF + N6 + 1
NEL- NC * NK
                                                                                     00023
                                                                                     00024
       CALCULATE DETERMINANT OF MATRIX
                                                                                     00025
                                                                                     00020
       DETERM = 1.
       DU 1000 1=1, NK
                                                                                     00027
       1016 = NB+1 + (1-1) # ( NP+Nb+1)
                                                                                     00028
 1060 DETERM = DETERM . BANULIDIG!
                                                                                     00.024
       SULVING FUR X IN AX = B
                                                                                     00030
       BAND MATRIX A IS DECUMPUSED INTO LU
                                                                                     00031
       THEREFURE (L * U) X = b

CALL UX = 2, THEN L2 = 6
C
                                                                                     00032
                                                                                     00033
       NUTE - DUE TO THE ANALYTICAL PROCEDURE, IT IS NOT NECESSARY TO MAICCOSA
               SEPARATE STURAGE LUCATIONS FOR ARRAYS X AND Z. FOR EACH EQUOUDES
               IN WHICH X HAS BEEN SUBSTITUTED FUR Z, A CUMMENT CARD PRECEDGOSO
       THE EQUATION AND CUNTAINS THE ACTUAL ANALYTICAL EQUATION. 00037
SULVING LUWER TRIANGULAR FURM LZ=B FOR GIVEN B. 00038
                                                                                     00039
       441 = 6111
       X(1) = 5(1)
                                                                                     00040
       10 = Nb + 1 + NL
                                                                                     00041
       DU 500 K=2,NK
                                                                                     00042
       S = BINI
                                                                                     00043
       UU 406 1=1.NE
                                                                                     00044
       1+ ((A-1) .LE. () GU 10 450
BD = BAND(10-1)
                                                                                     00045
                                                                                     00046
       UP = 218-11
                                                                                     00047
                                                                                     00048
       DP = X (K-1)
       S = S - BC + DP
                                                                                     00044
 400
      CUNT INUL
                                                                                     00050
450 IU = 10 + NC
                                                                                     00051
                                                                                     00052
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	& WHITNEY AIRCHAFT DIVISION	VEK	12/07/78	PAGE	SEKIAL
CSG.P	AN757	10.0	11.33.02	103	021269
	X(K) = 5		06053		
504	MNITHRE		00054		
C	SULVING UPPER TRIANGULAR FURM UX = 2 FUR THE ABOVE	1.	00055		
Č	XINK) = ZINK) / BANUINEL-NP)		00056		
100	X(NK) = X(NR) / BAND(NEL-NP)		00057		
	AK = NK-1		8<000		
	AR = AK		00059		
	DU 700 KRK=1,4KK		00060		
	10 = KK#NC -NP		00061		
C	S = 2(KK)		00002		
	S = X(NK)		00063		
	DU 600 1=1,NP		00064		
	IF ( NP .EQ. U ) GU TU 600		00005		
	IF ((AR+I) .GT. NR) GU TU 650		00000		
	BU = SANU(10+1)		00007		
	DF = X(KK+1)		00068		
	S = S - BO + DP		CCCOY		
600	CONTINUE		00010		
650	BC = BAND(ID)		00071		
	X(KR) = 5/80		00012		
	KR= KR-1		06073		
700	CUNTINUE		00074		
	DU 806 1=1,NK		00075		
800	XX(1) = X(1)		00076		
	KETUKN		51200		
	END		00078		

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PRATT & WHITNEY AIRCRAFT UIVISIUN
                                                                               VEK
                                                                                            12/07/78
CSG.PAN757
                                                                              10.0
                                                                                            11.33.02
                                                                                                                 104
                                                                                                                             021269
              DATA SET BESTEMRIS AT LEVEL OUT AS UF 12/07/76 DATA SET C75CTEMRIS AT LEVEL OOT AS UF 07/13/76
                                                                                             00001
       SUBROUTINE TEMRIS (TEMP, FA, PPSI, DELT, XLHV)
                                                                                             00002
                                                                                             00003
C THISE GENERAL TEMPERATURE HISE PRUGRAM
                                                                            DECK 6095
C MUCIFIED 12SEP77 TO EXTRAPULATE TO INLET TEMPERATURES LESS
                                                                                             OCCC4
C THAN 400 DEG KANKINE & 10 PRINT EKRUK MESSAGE DIMENSION CRV(416), KC( 5), PA( 5), Y(2)
                                                                                             00005
                                                                                             00000
       DATA PA/.333,1.,3.333,10.,20./
                                                                                             00007
       DATA KC/1,62,150,241,332/
                                                                                             00008
       EWUIVALENCE (CKV(1), CKVC)1(1)), (CKV(82), CKVO)2(1)), (CKV(158)
                                                                                             00009
      1, CKVG13(1)),(CKV(241),CRV014(1)),(CRV(332),CKV015(1))
                                                                                             00010
       DIMENSION CVG11(76)
                                                                                             00011
       EQUIVALENCE (CRVOII( 1), CVOII( 1))
                                                                                             00012
       DIMENSION CV013(76)
                                                                                             00013
       EQUIVALENCE (LKVG13( 1), LVC13( 1))
                                                                                             00014
       UIMENSIUN CV0141761
                                                                                              00015
       EQUIVALENCE (CRV014( 1), CV014( 1))
                                                                                             00010
                                                                                             00017
       DIMENSIUN CVOIS(76)
       EQUIVALENCE (CRV015( 1), CV015( 1))
PZE CRV11 DF-33906 TEMP KISE=F(F/A,112) P0=.333 S.H.=G.
                                                                                             00018
                                                                                          J P500014
       DIMENSIUN CHVC11( 81)
                                                                                             00020
      DATA CV011 / 4H , 4H , 0.4999999E-02, 0.8999999E-01
x, 0.4000000E 03, 0.2199999E 04, 0.2999999E-01, 0.4000000E 01
                                                                                             00021
      X, 0.86000000E 02,-0.13999999 61, 0.11111110E-02,-0.1444444 01
                                                                                             0(023
      X,-0.13834636E 01,-0.50939079E 01, 0.47743057E-00,-0.76961371E 01
                                                                                             00024
      A, 0.33700520E-00,-0.44123651E 02,-0.59003575E 01,-0.55029952E 01
                                                                                             00025
      X,-0.69494740E 02, 6.72465306E 03,-0.96109405E 01,-0.22627641E 01
                                                                                             000.0
      X, 0.20524796E 02,-0.12265240E 03, 0.11007864E 04, 0.619999994E-01

X, 0.500000000E 01, 0.62499999E 02,-0.28749999E 01, 0.11111110E-02

X,-0.14444444E 01, 0.10568205E 02, 0.11445136E 02, 0.29369278E 01
                                                                                             00027
      X, 0.10917355E 02, 0.23093461E 02,-0.33141516E 02, 0.13862297E 02
X, 0.32243802E 02,-0.40962536E 02,-0.14434102E 03, 0.27958808E 01
                                                                                             000 40
                                                                                             000 31
      X, 0.11522205E 02,-0.28871720E 02,-0.21055271E 03, 0.59706444E 03
X, 0.12880166E 01,-0.38360645E 01,-0.15971842E 02,-0.45276318E 02
                                                                                             00632
                                                                                             00033
      X,-0.35196384E 03, 0.24957401E 04, 0.8999996E-01, 0.50006600E 01
      x, C.71426576E 02,-0.54265713E 01, 0.11111110E-02,-0.1444444E 01
      X,-0.37893136E 01,-0.15674456E 02, 0.93605640E 61, 0.37101162E 02
                                                                                             00036
      X,-0.37291785E 02, 0.84586017E 01,-0.10961663E 02,-0.98135033E 01
                                                                                             00037
      x, 0.95618713E 02,-0.12548207E 03, 0.42655104E 01,-0.25616980E 01
x,-0.53461285E 02, 0.86214545E 02,-0.99939387E 01, 0.77281013E 00
                                                                                             80000
                                                                                             00039
       DIMENSIUN COULT
       EQUIVALENCE (CRVC11( 77), CGC1(1))
                                                                                             00042
                            -0.10952524E 01, 0.85139993E 01,-0.37314649E 02
       DATA LGG1 /
                                                                                             00043
      X .- 0.59263129E 03. C.30469201E 04
                                                                                             00044
                                                                                             00045
         PZE CRV12
                       DF-33966 TEMP RISE=F(F/A, TTZ) PO=1.0
                                                                        S.M. = 0.
                                                                                          J P50 0046
       DIMENSION CRVC121 761
                                                                                             00047
                                                                                             00048
       DATA CHVO12 / 4H
                                                 , 0.4999994E-02, 0.8999998E-01
      x, 0.40000000 03, 0.21999999 04, 0.29999999E-01, 0.30000000 01
                                                                                             00044
      X, C.600000000 02,-0.13999999 01, 0.11111110E-02,-0.1444444 01

X, 0.18064491E 01, 0.25598620E 01,-0.47377232E 02,-0.30955763E 01

X,-0.75557142E 02, C.72315768E 03,-0.12538243E 01, 0.95497160E 01
                                                                                             00050
                                                                                             00051
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PRATT & WHITNEY AIRCRAFT CIVISION
                                                                                         12/07/78
CSG. PAN757
                                                                                                             105
      x,-0.12292387E 03, 0.11028187E 04, 0.61999999E-01, 0.50000000E 01
                                                                                         00053
      x, 0.02499999E 02,-0.26749999E 01, 0.11111110E-02,-0.1444444E 01
                                                                                          00054
      x,-0.55794874E 00, 0.13170248E C2, 0.21780886E 01, 0.18198347E 02
                                                                                          00055
      x, C.15466705E 02,-0.26048174E 02, 0.13233642E 02, 0.19367967E 02
                                                                                          00056
      x,-0.51392150E 02,-0.12620277E 03, 0.28635873E 01, 0.64443620E 01
                                                                                         00057
      X,-0.40359426E 02,-0.18289059E 03, 0.63744988E 03, 0.56515026E 01

X,-0.66436682E 01,-0.17847223E 02,-0.29232:56E 02,-0.32201642E 03

X<sub>8</sub> 0.25155639E 04, 0.89999998E-01, 0.5000000'E 01, 0.71428570E 02
                                                                                          00058
                                                                                         00059
                                                                                          00000
      x,-0.54285/13E 01, 0.11111110E-02,-0.14444444 01,-0.13769680E 02
                                                                                          00061
      x,-0.13177426E 02, 0.12192937E 02, 0.43960214E 02,-0.58781216E 02
                                                                                          00002
      X, 0.35511422E 02,-0.14756564E 02, 0.22430874E 01: 0.95364440E 02
                                                                                          00063
      X,-0.15451889E 03, 0.366810C0E 01,-0.86575832E 01,-0.51047847E 02
                                                                                          00064
      x, 0.11545467E 03,-0.43063209E 02, 0.15298486E 01,-0.21108501E-00
x, 0.61557562E 01,-0.42230023E 02,-0.54747444E 03, 0.31217436E 04
                                                                                         00065
                                                                                          00006
      X/
                                                                                          00067
                     DF-33966 TEMP KISE=F(F/A, TTZ) PC=3.333 S.H.=0.
C
                                                                                          00069
       DIMENSION CRVC13( 83)
       DATA LV013 / 4H
                                               , 0.4999999E-02, 0.8999998E-01
                                                                                          00070
      x, 0.40000000E 03, 0.2199999E 04, 0.2999999E-01, 0.3000000E 01
x, 0.80000000E 02,-0.1399999E 01, 0.11111110E-02,-0.1444444E 01
                                                                                          00071
                                                                                          00072
      X, 0.22260093E 01, 0.40726461E 01,-0.46363929E 02,-0.14957386E 01
                                                                                          00073
      x,-0.73768441E 02, 0.72323057E 03, 0.10325611E-00, 0.10598011E 02
                                                                                          00074
      X,-C.12367981E 03, 0.11025447E 04, 0.61999999E-01, 0.50060000E 01
X, G.6249999E 02,-U.26749999E 01, C.11111110E-02,-O.14444444E 01
                                                                                          00075
                                                                                          00076
      X, C.4266666E-00, O.16154609E 02,-0.8727273GE 00, O.18946281E 02
X, G.16793369E 01,-0.26603704E 02, O.11660666E 02, O.72374559E 01
                                                                                          00077
                                                                                          00078
      X,-0.57770953E 02,-0.10280920E 03, 0.26086922E 01, 0.21229458E 01
                                                                                          00079
      x,-0.42403212E 02,-0.14596709E 03, 0.67302856E 03, 0.53360699E 01
                                                                                          00080
      x,-0.37769614E 01,-0.16326205E 02,-0.16819857E 02,-0.29494584E 03
      X, C.25507350E 04, 0.89999998E-01, 0.59999999E 01, 0.71428570E 02
X,-0.54285713E 01, 0.11111110E-02,-0.1444444E 01, 0.13732976E 02
                                                                                          00002
                                                                                          00083
      x, 0.55035750E 02,-0.30540320E 02,-0.31598216E 02, 0.20814981E 01
                                                                                          00084
      X, 0.35665293E 01, 0.44925446E 01, 0.40762997E 02,-0.15302914E 03
                                                                                          00005
      X, U.76453541E V2,-U.36391904E 01,-U.11904426E 02, 0.47753501E 02
                                                                                          00000
         C.70651698E 02,-0.1664331+E 03, 0.22297149E 01, 6.84662928E 00
                                                                                          00007
                                                                                          00088
      x,-C.1/3774/9E 02,-U.350/0207E 02, 0.15775427E 03,-0.92999332E 02
                                                                                          00089
       DIMENSIUN LOCAL
                                                                                          00040
       EQUIVALENCE (CKVG131 77), CGC2(11)
                                                                                          00071
      UATA CCC2 / -0.045/5390E 00, 0.29177525E 01, 0.20401952E 01 x,-0.0326016E 00,-0.46892191E 02,-0.49265007E 03, 0.31970481E 04
                                                                                          00092
                                                                                          00043
                                                                                          00044
C
        PLE CKV14 UF-33460 TEMP KISE=F(F/A, 172) PO=10.0 S.H.=0.
                                                                                      12500045
       DIMENSIUN CKVOI41 911
                                                                                          00046
      UATA CVC14 / 4H , 4H , 0.4799999E-02, 0.8999998E-01 x, 0.40000000E 03, 0.21999999E 04, 0.2999999E-01, 0.3000000E 01
                                                                                          00091
                                                                                          00040
      x, C.8UCCCCCCE 02,-U.13999999E 01, O.11111110E-02,-0.1444444E 01
                                                                                          00099
      X, C.27654344E G1, C.53247484E G1,-C.45404014E 02,-0.28440260E-00
                                                                                          00100
      x,-C.72058441E 02, C.72501574E 03, O.14160834E-00, O.11352272E 02
                                                                                          00101
      x,-0.12347148E 03, 0.11023968E C4, 0.61999999E-01, 0.50000000E 01
                                                                                          00102
      X, 0.62477774 62,-C.20747774 01, 0.11111110E-02,-0.1444444 01
X,-0.16377466 01, 0.6767756 01,-0.57622645 01, 0.14475207 02
                                                                                          00163
                                                                                          00104
      X,-0.96622174E 01,-0.24567702E 02, 0.75165860E 01,-0.10081169E 01
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THE RESIDENCE OF THE PROPERTY OF

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PRATT & WHITNEY AIRCKAFT ULVISION
                                                                                 12/07/78
CSG . PAN 157
                                                                    16.0
                                                                                 11.35.02
                                                                                                  100
                                                                                                             021264
     X,-0.41495395E 02,-0.79884857E 02, 0.3/158929E 01,-0.63133743E 00 00106
     X,-C.37370430E 02,-U.114540U3E 03, 0.69732000E 03, 0.20765900E 01
                                                                                 ULLUI
     x,-6.54497106E 01,-0.11160222E 02,-0.62589833E 01,-0.27993259E 03
     X, 0.253687316 04, 0.899999986-01, 0.700000000 01, 0.714285736 02
                                                                                 00109
     x,-0.54285713E 01, 0.11111110E-02,-0.14444444E 01, 0.10522443E 02
                                                                                 00110
     x,-0.84630529E 02, 0.39647940E 02,-0.24772479E 02, 0.69868640E 02
                                                                                 06111
     x,-6.55198689E 02, 0.17446780E 02,-0.45914562E 02, 0.13779138E 03
                                                                                 00112
     x,-0.35097630E 62,-0.86224490E 61, 0.14819852E 02, 0.65746176E 02
     x,-0.19383461E 03, 0.12623758E 03, 0.13253794E 01,-0.80106048E 01
                                                                                 00114
     x,-0.23622637E 02, U.73180402E 02,-0.86547222E 00,-0.19394286E 03
                                                                                 00115
                                                                                 00116
      DIMENSION CO031 151
                                                                                  00117
      EQUIVALENCE(CRV014( 77), C003(1))
                                                                                 00118
      UATA L003 /
                        -C.5/665043E-01, 0.73929541E 0C, 0.52074192E 01
                                                                                 00119
      x,-C.22080105E 02,-0.27097432E 02, 0.17510998E 03,-0.14469204E 03
     x,-0.85625321E 01, 0.31139123E 01, 0.17688836E 02,-0.33933540E 01
                                                                                 OUILL
                                                                                 00122
     A,-0.10237508E 02,-0.42254121E 02,-0.44120632E U3, 0.32502860E 04
     X/
                                                                                 00123
       PZE LKV15 Dr-33900 [EMP KISE=r(r/A, ITZ) PG=20.0 S.H.=G.
                                                                              JP500124
      DIMENSIUN CRVC15( 05)
                                                                                 06125
      DATA CVC15 / 4H
                                          , 0.4777779E-02, 0.8779798E-01
                                                                                 00126
     x, 0.40000000 03, 0.21999999 04, 0.29999999 01, 0.30000000 01
x, 0.80000000 02,-0.13999999 01, 0.11111110E-02,-0.1444444 01
                                                                                 001.7
                                                                                 00128
     x, 0.2763310ze 01, 0.593z4z70e 01,-0.45546e75e 02, 0.43851170e-00 x,-0.72081818e 02, 0.722917zse 03, 0.46612765e-00, 0.11633523e 02 x,-0.12371477e 03, 0.11022825e 04, 0.61999999e-01, 0.40000000e 01
                                                                                 00129
                                                                                 00130
                                                                                 00131
     X, 0.62499999 02,-0.28749999 01, 0.11111110E-02,-0.1444444 01
      x,-0.27897430E 01,-0.10825344E 02,-0.10000195E 02,-0.59132233E 01
     x,-0.26809445E 62,-0.73565315E 02,-0.15978147E 01,-0.21845455E 02
                                                                                 00134
     x,-0.15155672E C3, 6.70169022E 03,-0.67839272E 01,-0.41892483E 01 06135
     x, 0.176/8656E 01,-0.2/364410E 03, 0.23431748E 04, 0.8777778E-01
                                                                                 00136
     x, 0.700000000 C1, 0.7142857(E 02,-0.54285713E 01, 0.1111111CE-02 00137
      X,-C.14444444 01,-C.38700332E 01,-O.11812907E 03, U.58871721E U2
                                                                                 00138
      X,-0.718280 13E 01, U.72402435E 02,-0.48967353E 02, 0.52289867E 01
      X,-0.473035716 02, 0.211.017ce 03,-0.677681566 02,-0.321786266 01
                                                                                 00140
     A, U.18815599E 02, 0.29021554E 02,-0.20544367E 03, 0.16032206E 03
                                                                                 00141
     x, 0.44605371E 60,-0.00074476E 61,-0.74355034E 61, 0.74772408E 02
                                                                                 00142
     A,-C.55517517E 02,-C.1897671EE 05,-O.56660067E 01, 0.17920320E 01

X, 0.81747167E 01,-0.24669963E 02,-C.61785530E 01, 0.17684620E 03
                                                                                 06143
                                                                                 00144
                                                                                 00146
      DIMENSIUN CGG41 Y)
       EWUIVALENCEICKVC15( 771,C004(1))
                                                                                 00147
     DATA COC4 / -C.18164793E 05, C.22823727E 01,-0.86419732E CO
x,-C.13271917E 01, 0.33648799E-00,-0.49178839E 01,-C.37280399E 02
                                                                                 GC148
                                                                                 00144
     X,-0.41150190E 03, 0.32700557E 64
                                                                                 00150
                                                                                 06151
      PPSF = PPSI * 144.0
                                                                                 00152
      P = PFSF /2116.216
T = TEMP
                                                                                 00153
                                                                                 00154
      F = FA
                                                                                 00155
      DU 5 K=2.5
IF(P .LE. PA(K))GU TU 140
                                                                                 00156
                                                                                  00157
    5 LUNTINUE
                                                                                 00158
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CSG.PAN757	PRATT & WHITNEY AIRCRAFT DIVISION	VER	12/07/78	PAGE	SERIAL
140 F * F ^ XLHV / 18500.0  00 22C 1 * 1.2	CSG.PAN757	10.0	11.33.02	107	
00 22G 1 = 1,2  K1 = K + 1 - 2  O0162  KK = KC(K1)  Y(1) = PVAL (CRV(KK), F, T, 2, 1E)  O0164  IF (1E.NE.1) GO TU 22O  Y(1) = Y(1) * F / .005  220 CONTINUE  DELT=(Y(2)-Y(1))*((P-PA(K-1))/(PA(K)-PA(K-1))) + Y(1)  C EXTRAPULATION TO INLET TEMPERATURES LESS THAN 400 DEG RANKINE  O1069  IF (TEMP .LT. 400.)DELT = UELT*(11.44E-4*(TEMP-400.))  C ERRUK MESSAGE  IF (NE .EU. 0)GO TO 60C  GO TO (600,400,600,400,600,400,400,400),IE  O0173  400 MKITE (6,500) IE, TEMP, FA  O0174  500 FORMAT (T2,*UPPEK LIMIT ON FUEL/AIR (.09) UR INLET TEMP (220C R) MAOCI75  XS EXCLEDED IN SUBR. TEMKIS - IE, TEMP, FA=*,  YT100, II, T110, F10.1, T120, F10.4)  O0 RETURN	K = 5		00159		
R1 = K + 1 - 2	140 F = F A XLHV / 18500.0		00160		
NK = KC(K1)	00 226 1 = 1.2		00161		
Y(1) = PVAL (CRV(KK), F, T, 2, 1E)  1F (1E NE-1) GO TU 220  Y(1) = Y(1) * F / .005  220 CONTINUE  DELT=(Y(2)-Y(1))*((P-PA(K-1))/(PA(K)-PA(K-1))) + Y(1)  CETRAPULATION TO INLET TEMPERATURES LESS THAN 400 DEG RANKINE  O0109  1F(TEMP .LT. 400.)DELT = UELT*(11.44E-4*(TEMP-400.))  CERRUK MESSAGE  1F(1E .EU. O)GO TO 60C  GO TO(600,400,600,400,600,400,400,400),IE  O0172  400 MKITE(6,500)1E,TEMP,FA  500 FORMAT(T2,*UPPEK LIMIT ON FUEL/AIR (.09) OR INLET TEMP (220C R) MADC175  XS EXCLEDED IN SUBK. TEMKIS - IE,TEMP,FA=*,  YT100,11,T110,F10.1,T120,F10.4)  600 RETURN  00178	K1 = K + 1 - 2		00162		
IF (IE.NE.1) GO TU 220 Y(1) = Y(1) * F / .005  220 CONTINUE DELT=(Y(2)-Y(1))*((P-PA(K-1))/(PA(K)-PA(K-1))) + Y(1) OC167 DELT=(Y(2)-Y(1))*((P-PA(K-1))/(PA(K)-PA(K-1))) + Y(1) OC168  C EXTRAPULATION TO INLET TEMPERATURES LESS THAN 400 DEG RANKINE OC169 IF(TEMP .LT. 400.)DELT = UELT*(11.44E-4*(TEMP-400.)) OC170  C ERRUK MESSAGE GO TU 600, 400,600,400,600,400,400,400),IE OC172 GO TU 600,400,600,600,400,600,400,400,1E OC173  400 MKITE(6,500)IE,TEMP,FA OC174  500 FÜRMAT (T2,*UPPEK LIMIT ON FUEL/AIR (.09) UR INLET TEMP (220C R) WAOC175 XS EXCLEDED IN SUBR. TEMKIS - IE,TEMP,FA=*,	KK = KC(K1)		00163		
Y(1) = Y(1) * F / .005  220 CONTINUE  C ETTER(Y(2)-Y(1))*((P-PA(K-1))/(PA(K)-PA(K-1))) + Y(1)  C EXTRAPULATION TO INLET TEMPERATURES LESS THAN 400 DEG RANKINE  O1069  1F(TEMP .LT. 400.)DELT = UELT*(11.44E-4*(TEMP-400.))  C ERRUR MESSAGE  IF(IL .EU. 0)GO TO 60C  GO TO 600,400,600,400,600,400,400,400),IE  O0173  400 WKITE(6,500)IE,TEMP,FA  500 FORMAT(T2,*UPPEK LIMIT ON FUEL/AIR (.09) UR INLET TEMP (220C R) WAOC175  XS EXCLEDED IN SUBR. TEMKIS - IE,TEMP,FA=*,  V1100,11,T110,F10.1,T120,F10.4)  600 RETURN	Y(1) = PVAL (CRV(KK), F, T, 2, 1E)		00164		
220 CONTINUE  DELT=(Y(2)-Y(1))*((P-PA(K-1))/(PA(K)-PA(K-1))) + Y(1)  CETRAPULATION TO INLET TEMPERATURES LESS THAN 400 DEG RANKINE  O0169  1F(TEMP .LT. 400.)DELT = UELT*(11.44E-4*(TEMP-400.))  CERRUR MESSAGE  IF (1E .EU. 0)GO TO 600  GO TO (600,400,600,400,400,400,400),IE  O0173  400 MKITE (6,500)1E, TEMP, FA  500 FORMAT (T2,*UPPEK LIMIT ON FUEL/AIR (.09) OR INLET TEMP (220C R) MADC175  XS EXCLEDED IN SUBK. TEMKIS - IE, TEMP, FA=*,  YT100,11,T110,F10.1,T120,F10.4)  O0178	IF (1E.NE.1) GO TU 220		00165		
DELT=(Y(2)-Y(1))*((P-PA(K-1))/(PA(K)-PA(K-1))) + Y(1) 00168  C EXTRAPULATION TO INLET TEMPERATURES LESS THAN 400 DEG RANKINE 00169  IF(TEMP .LI. 400.)DELT = DELT*(11.44E-4*(TEMP-400.)) 00170  C ERRUR MESSAGE 00171  IF(IE .EQ. 0)GO TO 60C 00172  GO TO(600,400,600,400,600,400,400,400),IE 00173  400 MKITE(6,500)IE,TEMP,FA 00174  500 FORMAT(T2,*UPPEK LIMIT ON FUEL/AIR (.09) UR INLET TEMP (220C R) WAGC175  XS EXCLEDED IN SUBR. TEMKIS - IE,TEMP,FA=*, 00176  YT100,11,T110,F10.1,T120,F10.4) 00178	Y(1) = Y(1) * F / .005		00166		
C EXTRAPULATION TO INLET TEMPERATURES LESS THAN 400 DEG RANKINE 00169  1F(TEMP .LT. 400.)DELT = UELT*(11.44E-4*(TEMP-400.)) 00170  C ERRUK MESSAGE 00172  GO TU(600,400,600,400,600,400,400,400,1E 00173  400 HKITE(6,500)IE,TEMP,FA 00174  500 FÜRMAT(T2,*UPPEK LIMIT ON FUEL/AIR (.09) UR INLET TEMP (2200 R) WAOC175  XS EXCLEDED IN SUBR. TEMKIS - IE,TEMP,FA=*, 00176  YT100,II,T110,F10.1,T120,F10.4) 00178	220 CONTINUE		00167		
1F(TEMP .LT. 400.)DELT = UELT*(11.44E-4*(TEMP-400.))  C ERRUR MESSAGE  IF(IE .EU. 0)GU TU 60C  GO TU(600,400,600,400,600,400,400,400),IE  00173  400 WKITE(6,500)IE,TEMP,FA  500 FORMAT(T2,*UPPEK LIMIT UN FUEL/AIR (.09) UR INLET TEMP (220C R) WAOC175  XS EXCLEDED IN SUBR. TEMKIS - IE,TEMP,FA=*,  VT100,II,TII0,FIU.I,TI20,FI0.4)  600 RETURN  00178	DELT= (Y(2)-Y(1))+((P-PA(K-1))/(PA(K)-PA(K-1))	+ Y(1)	00168		
C ERRUR MESSAGE  IF(I =	C EXTRAPULATION TO INLET TEMPERATURES LESS THAN 400	DEG RANKINE	00169		
IF(IE .EQ. 0)GU TU 60C 00172 GU TU(600,400,600,400,600,400,400,400),IE 00173 400 MKITE(6,500)IE,TEMP,FA 00174 500 FORMAT(T2,*UPPEK LIMIT UN FUEL/AIR (.09) UR INLET TEMP (220C R) WADC175 XS EXCEEDED IN SUBR. TEMRIS - IE,TEMP,FA=*, 00176 YT100,II,T110,F10.1,T120,F10.4) 00178	1F(TEMP .LT. 400.)DELT = UELT+(11.44E-4+(TE)	19-400.))	00170		
GD TU(600,400,600,400,600,400,400,400),IE 00173  400 MRITE(6,500)IE,TEMP,FA 00174  500 FORMAT(T2,*UPPEK LIMIT ON FUEL/AIR (.09) UR INLET TEMP (2200 R) WAGG175  XS EXLEEDED IN SUBR. TEMRIS - IE,TEMP,FA=*, 00176  YT100,I1,T110,F10.1,T120,F10.4) 00178	C ERRUK MESSAGE				
400 WKITE(6,500)1E,TEMP,FA  500 FORMAT(T2,*UPPEK LIMIT ON FUEL/AIR (.09) UR INLET TEMP (2200 R) WAOC175  XS EXCLEDED IN SUBR. TEMKIS - IE,TEMP,FA=*,	IF(IE .EQ. O)GO TO 600		00172		
400 WKITE(6,500)1E,TEMP,FA  500 FORMAT(T2,*UPPEK LIMIT ON FUEL/AIR (.09) UR INLET TEMP (2200 R) WAOC175  XS EXCLEDED IN SUBR. TEMKIS - IE,TEMP,FA=*,	GO 10(600,400,600,400,600,400,400,400).IE		00173		
500 FORMAT(T2, *UPPEK LIMIT ON FUEL/AIR (.09) UR INLET TEMP (2200 R) WAGG175 XS EXCEEDED IN SUBR. TEMRIS - IE, TEMP, FA=*, 00176 YT100,11,T110,F10.1,T120,F10.4) 00177 600 RETURN 00178			00174		
YT100,11,T110,F10.1,T120,F10.4) 0C177 600 RETURN 00178		LET TEMP (2200 F	R) WAOC175		
600 RETURN 00178	XS EXCEEDED IN SUBR. TEMRIS - IE.TEMP. FA= .		00176		
	YT100,11,T110,F10.1,T120,F10.4)		00177		
	600 RETURN				
END 00179	END		00179		

PRATI & WHITNEY AIRCRAFT DIVISION	VER	12/07/78	PAGE	SEKIAL
CSG.PAN757 ,	10.0	11.33.02	108	021.69
6 0.71 6.7 0.20071051 17 (00) 001 14 (05 10 40 77)				
C DATA SET B28UTIDEAL AT LEVEL OCT AS UF 12/07/76 C DATA SET B28UINPUT AT LEVEL 013 AS UF 02/23/78	E33			
		00001		
SUBRUUTINE TIDEAL (FA, FAV, P, T, XLHV,		00002		
X DT1, DT1P, DT1T, FAT, TF, ZTF)		00003		
C IDEAL TEMP RISE (DTI) VS. FUEL/AIR (FA) ,		00004		
C ACCUUNTING FOR VITIATED FUEL/AIK (FAV)		00005		
C FIND FICTICIOUS INLET TEMP (TF) WHICH YIELDS DTIP=T-TF AT	FAV	00006		
DT1P = C.		00007		
DU 1000 J=1,10		80000		
TF = T-UTIP		00009		
CALL TEMRIS(TF, FAV, P, DTIP, XLHV)		00010		
TA = TF+DT1P		00011		
1+(ABS(TX-T) .LE. 5.)GU TU 1005		00012		
1000 CUNTINUE		00013		
WKITE(6,1001)		00014		
1001 FURMATITZ, CONVERGENCE FAILURE AUGMENTUR IDEAL TEMPER	ATURE KIS	E' 1 00015		
WRITE (6.1002)TF.FAV.P.DTIP.XLHV.TX		00016		
1002 FURMAT(T2, 'TF, FAV, P, DTIP, XLHV, TX=', T30, 6E15.5)		00017		
1005 FAT = FAY+(1.+FAY)*FA		00018		
CALL TEMPIS(TF, FAT. P, DTIT, XLHV)		00019		
DT1 = DT1T-OT1P		00020		
C DOLESS PARTIAL OF IDEAL TEMP RISE WITH FUEL/AIR (ZTF)		00021		
FA1 = AMAX1(FAT002.0.)		00022		
CALL TEMRIS(TF, FAI, P, DT, 1, XLHV)		00023		
FA2 = FAT+.002		00024		
CALL TEMRIS(TF. +AZ. +F. DTIZ. XLHV)		00025		
ZTF = 1.		00046		
1F(DT1 .GT. 0.)ZTF = FA/DT1*(DT12-DT11)/(FA2-FA1)*(1	ALAVI	00027		
RETURN		00028		
FND		00028		
ENU		00029		

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PRATT & WHITNEY ALKCRAFT DIVISION
                                                                                               12/07/78
                                                                                  VER
                                                                                                                   PAGE
                                                                                                                                 SERIAL
CSG.PAN757
                                                                                10.0
                                                                                                                                 021269
                                                                                                11.33.02
                                                                                                                    104
              DATA SET BEBUUNDAK AT LEVEL GOL AS OF 12/07/78 E33
       SUBROUTINE UNDAR(I,IK,XIN,YIN,ZZ,RK)
UNDAR(I,IK,XIN,YIN,ZZ,RK)
                                                                                                00001
                                                                                                00062
CDATE
            MAKCH 4,1961 REVISED 7/62
                                                                                                00003
CPURPOSE TO INTERPOLATE A UNIVARIATE UR BIVARIATE TABLE.
                                                                                                00004
            THE ARGUMENTS IN THE LIST ARE DEFINED AS FULLOWS- 00005

T =NAME OF THE ARRAY WHICH CONTAINS THE TABLE VALUES. 00006

IN =ELEMENT OF THE ARRAY AT WHICH THE TABLE STARTS. IF YOU HAVEOUCOT
CUSAGE
           THE ARKAY, IN-UNE XIN-INDEPENDENT VARIABLE IN THE X-SENSE.
C
                                                                                                COCLB
                                                                                                00009
            YIN-INDEPENDENT VARIABLE IN THE Y-SENSE. IF THE TABLE IS A
C
                                                                                                00010
            UNIVARIATE, THEN YIN IS LERU.
                                                                                                00011
C
           ZZ =DEPENDENT VAKIABLE.
KK =UFF TABLE INDICATUR.
                                                                                                00012
                                                                                                000 13
C
Č
            =0 NURMAL EVALUATION.
                                                                                                06614
C
            =1 UFF UN X MIN.
                                                                                                00015
            =2 UFF UN X MAX.
                                                                                                00016
C
                                                                                                00017
            =3 LFF UN Y MIN.
           =4 UFF ON X MIN. AND Y MIN. =5 UFF ON X MAX. AND Y MIN.
                                                                                                90018
C
                                                                                                00019
c
            -6 UFF UN Y MAX.
                                                                                                00020
            =7 LFF UN A MIN. AND Y MAX.
                                                                                                60021
C
            =6 UFF UN X MAX. AND Y MAX.
                                                                                                00022
C
                                                                                                00023
            = LESS THAN O, TABLE SET UP WKUNG.
                                                                                                00024
C
           IF EITHER VARIABLE IS UFF THE TABLE, UNBAR WILL KETURN THE
            CURNER VALUE. THIS IMPLIES THAT UNBAR WILL NUT EXTRAPULATE
                                                                                                00025
           AND DUES NOT RECOGNIZE ANY DISCONTINUTIES.
C
                                                                                                00020
            THE TABLE MUST BE SET UP AS FULLUM S-ALL NUMBERS ARE IN FLUATI NGOCC 27
C
            PUINT MUDE.
                                                                                                00028
            TILKI = CUNVE NU.
                                                                                                00024
            T(IR+1) =NX. NU. UF X VALUES.

T(IR+2) =NY. NU. UF Y VALUES. (IN UNIVARIATE MAKE ZERU.)
C
                                                                                                00031
            T(IR++) = X VALUES IN ASCENDING ORDER.
T(IR++) = Y VALUES IN ASCENDING ORDER.
                                                                                                00032
200
                                                                                                00033
            T(IN++) = 2 VALUES. PUT THEM IN FULLUWING URDER-2(1,1),2(1,2),
                                                                                                00034
            Z(1,3)---Z(1,NY),Z(Z,1),Z(Z,Z)---Z(Z,NY)---Z(NX,1),
Z(NA,Z)---Z(NX,NY). FUR DIVARIATE UNLY.
                                                                                                00035
                                                                                                00036
            IN THE REVISED UNDAR THERE IS THE UPTION OF USING A FIRST, SECOCOST
           THIRD UNDER INTERPOLATION EQUATION. TO USE THIS OPTION PUT THE 00038 DEGREE IN FLUATING POINT SETWEEN T(IR) AND T(IR+1). IF THIS NUMO0039 IS GREATER THAN 3.0, THEN THE ASSUMITION IS MADE THAT THIS IS IM00040 NUMBER UF A,S. THIS MEANS THAT TABLES THAT WERE SET UP FUR THE 00041
C
c
            UNDAK CAN BE USED IN THE REVISED EDITION. THUS THE REVISED TABLOTO-2
C
            DE AS FULLUMS.
                                                                                                00043
                                                                                                00044
C
            TIIKI = LUKVE NU.
            T(IR+1)=DEGREE OF INTERPOLATION.
T(IR+2)=NX. NO. OF X VALUES.
                                                                                                00045
                                                                                                00040
                                                                                                00047
            NUTE. WHEN DUING AN N-TH DEGREE INTERPULATION, YOU MUST HAVE ATOOGAB
            LEAST N+1 PUINTS. N = 1, 2, UK 3.
                                                                                                00049
        CIMENSIUN DUMXD(2)
                                                                                                00050
        DIMENSION TILLIANOLAYIOLAGO
                                                                                                00051
                              MARCH 4, 1961 -----
                                                                                                00052
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PRATT & WHITNEY ALKCKAFT DIVISION CSG.PAN 157
                                                                   16.0
                                                                                12/07/78
                                                                                                 PAGE
                                                                                                            SEKIAL
                                                                                                            641407
                                                                                11.33.02
                                                                                                  110
      ----- MUDIFIED 7/62 ---
                            TU DU QUADRATIC AND LINEAR INTERPULATION ALSO 00054
      10 = 0
                                                                                 00055
      KY = 0
                                                                                 00006
                                                                                 00057
      11 = 1K+1
N = 3
                                                                                 06658
                                                                                 00055
                                                                                 00000
      NZ= 2
            1+ (1(111-3.1 700,101,762
                                                                                 occo1
          1F (1(11)+(.) 6C,761,764
1F (1(11)-2.) 765,766,761
 700
                                                                                 00002
 704
                                                                                 000003
      N = 1
                                                                                 00064
 705
            GL TU 767
                                                                                 00005
 700 N = 2
 707 NZ= 1
                                                                                 00007
                                                                                 00008
  701 11 = 11 +1
  702 NI = N +1
                                                                                 000 10
            UL 50 L = 11,11
        IF ( T(L) + 0. ) 00,00,51
                                                                                 00071
                                                                                 00072
 60
       ZZ = 0.
                                                                                 000/3
                                                                                 00074
          60 TU 9999
       NX = T(L) + .5
 51
           IF (T(L+1) + 0. 1 60,52,50
                                                                                 00076
       NY = 0
                                                                                 11000
 52
            66 10 53
                                                                                 000 /6
       NY = T(L+1) + .5
                                                                                 00079
 50
         CUNTINUE
                                                                                 00080
          = 0
                                                                                 18000
          = 0
                                                                                 06682
       KY
                                                                                 00083
       XX = XIN
          = YIN
                                                                                 00084
       J1 = 11+2
                                                                                 00085
          = NX+11+1
                                                                                 00086
       1F(XX-T(J1)1361,300,400
                                                                                 00087
            DU 302 J=J1,J2
IF (XX-7(J)) 304,304,502
                                                                                 C0088
 400
                                                                                 06.089
                                                                                 00090
       CUNTINUE
 302
                                                                                 00091
 309
       Kn = 2
xx = 1(J2)
                                                                                 00042
 308
       JX1 = J2-N
                                                                                 00043
                                                                                 00094
            60 10 305
 301 KK = 1
XX = T(J1)
                                                                                 00095
                                                                                 00096
                                                                                 00097
       JX1 = J1
 306
            60 TU 305
                                                                                 00048
            1F (J-J1-1) 361,306,367
1F (J-J2) 303,306,309
 304
                                                                                 00099
 307
                                                                                 00100
                                                                                 00101
      JX1 = J-NZ
 303
                                                                                 00172
       CUNTINUE
 305
       XINT = XX

IF (NY) 1500, 1500, 3000

DU 1599 L=1,N1
                                                                                 00103
                                                                                 00164
                                                                                 00105
```

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PRATT & WHITNEY ALKCHAFT DIVISION CSG. PAN 757
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                                                                                            11.33.02
                                                                                                                            021269
               X(L) = T(JX1)

LY = JX1 + NX

Y(L) = T(LY)
                                                                                             00166
                                                                                            00107
                                                                                             00108
         JX1 = JX1+1
                                                                                             00109
 1599
        1 = 1
                                                                                             00110
        60 TU 54
                                                                                             00111
 3060 J1 = J1+NX
J2 = J2+NY
IF(YY-T(J1))311,310,401
                                                                                             00112
                                                                                             00113
                                                                                             00114
            00 312 J=J1,J2
1F (YY-T(J)) 314,314,312
                                                                                             00115
 401
                                                                                             00116
       CUNTINUE
                                                                                             00117
       KY = 6
YY = 1(J2)
                                                                                             66118
                                                                                             00119
      JY1 = J2-N
GC TO 315
 318
                                                                                             00120
                                                                                             00121
 311 KY = 3
                                                                                             00122
        YY = T(J1)
                                                                                             00123
       JY1 = J1
                                                                                             00124
              66 TO 315

1F (J-J1-1) 311,310,317

1F (J-J2) 313,316,319
                                                                                             00125
 314
                                                                                             00126
 317
                                                                                             00127
       JY1 = J-N2
                                                                                             00126
       CUNTINUE
 315
                                                                                             00129
        JX2 = JX1
LY = JY1 + NY*(JX2-11-1)
                                                                                             00130
                                                                                             00131
        DC 3099 L=1,N1
                                                                                             00132
                                                                                             00133
        XIL) = T(JXL)
                                                                                             00134
        Y(L) = T(LY1)
                                                                                             00135
       LY1 = LY1+NY
                                                                                             00136
 3045 JAZ = JXZ+1
                                                                                             00137
                                                                                             06138
              60 TU 54
                                                                                             00134
 3096 Y(1) = 22
LU 4400 1=1,N
LY1 = LY+1
                                                                                             00140
                                                                                             00141
                                                                                             00142
        Y(1+1) = C.
                                                                                             06143
             00 4050 MM=1,N1
                                                                                             00144
 Y(1+1) = Y(1+1) + ((LY1)*X(MM)
405C LY1 = LY1+NY
440G CONTINUE
                                                                                             00145
                                                                                             06146
                                                                                             00147
            00 4199 L=1,N1
                                                                                             00148
 *159 JY1 = JY1+1

XINT = YY
                                                                                             00149
                                                                                             00150
                                                                                             00151
       1= 1
6 = 1.
                                                                                             00152
                                                                                             00153
        X(N+2) = X(1)
X(N+3) = X(2)
                                                                                             0(154
                                                                                             00155
             UU 50 J=1, N1
                                                                                             00156
        A(J+1) = X(J+1) - X(J)
1PAL1 = XINT - X(J)
                                                                                             00157
                                                                                             06156
```

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PRATT & WHITNEY AIKCRAFT DIVISION CSG.PAN757		VER	12/07/78	PAGE	SERIAL
		10.0	11.33.02	112	021269
	IF ( TPAL1 ) 57,58,57		00159		
58	22 = Y (J)		00160		
26	X(1) = 0.		00161		
	$X(\zeta) = C.$		00102		
	X(3) = 0.		00103		
	X(4) = 0.		00164		
	X(J) = 1.0		00165		
	GU TU 59		00100		
57			00167		
21			00168		1-16-11
***	GU TU (711,712,713) ,N		60169		
/11	X(J) = TPAL1/A(J+1)				
•••	GO TO 55		00170		
112	X(J) = -TPAL1		00171		
	60 TO 55		001/2		
	X(J) = (X(J+2)-X(J))+TPAL1		00173		
55	CONTINUE		00174		
	A(1) = A(N+2)		00175		
	22 = 0.		0(1/6		
	DU 56 J=1,N1		00177		
	$((U)X + (I+U)A+(U)A) \setminus (U)X$		001/8		
	2Z = ZZ + Y(J) + X(J)		00179		
56	CONTINUE		00160		
59	1F (1) 3098,3098,9999		00181		
9999	KK = KK+KY		00182		
	RETURN		00183		
	END		00184		

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PRATT & WHITNEY AIRCRAFT DIVISION CSG.PAN757
                                                                                                VEK
                                                                                                                12/07/78
                                                                                                                                        PAGE
                                                                                                                                                       SEKIAL
                                                                                              10.0
                                                                                                                                         113
                                                                                                                                                       021264
         DATA SET BESCHARE AT LEVEL OOL AS UF 12/07/78 E33
SUBROUTINE WAKE(K, OTF1)
                                                                                                                 00001
C PURPUSE
                   EVALUATES WARE REALTION EFFICIENCY AND TEMPERATURE
                                                                                                                 00002
         COMMON /CINPT/FHW, PFSK, PS, TFSR, JFUEL, VA, TA, XF, TAU, ALPHA, FAR
                                                                                                                 00003
                                                                                                                 00004
        X, XL, EPS, CDFH, FAKMD, 15TRM, WEXT, TEXT
        COMMON /OTPUT/ MOUTA, MOUTF, MOTFLO, MOTFVG, BETA1, B2, DL(5), B1(5), XTLF(5), MDTFC, K1, PS1, TLFEX, B3, TW, ETAFM X, DLU(5), B1E, DMDUT, BOC, RTVO, DQDUT, Y, SL, EPSO, V, XO, EPS XO, ETAO
                                                                                                                 00005
                                                                                                                 00000
                                                                                                                 00007
        X,STO,X1(100),EPSX1(100),ST1(100),ETA(100),NSTEP,TAEFF

COMMON /M1SL/ RHUA,MUA,ADUCT,PI,LDC, FHWIMP,B1T,KM,TFO,DLF(5)
A,BETAZ(5),ETAW,MDTFL1,TLC,MDUTFL(5),FAKW,STBAK,FAKE
                                                                                                                 80000
                                                                                                                 00009
                                                                                                                 00010
        CUMMON /CKVS/ CKVMUA(44),CKVKM(44),CKVLM(22),CKVPV(24) 00011

X,CKVSL(36),CKVPR(30), TKJP4(283),CKVTSL(26) 00012

X,CKVCPT(26),CKVPT(26),CKVPTR(24),CKVSLE(16),CKVEVP(16),CKVTSP(16) 00013
         DIMENSIUN STUIFA(4)
                                                                                                                 00014
         DATA STOIFA /.008,.009,.009,.004 /
TOL = .001
                                                                                                                 00015
                                                                                                                 00016
      TUL = .001

STFAR = STUIFA(JFUEL)

PHI = FARW/ STFAR

IF (ISTRM .EQ.1) TAEFF = TA

CURVE 15 THE SAME FUR JP4 AND JP5

CALL UNBAK (TKJP4,1,FARW,TAEFF,DTF1,KS)

DIFI = DTF1 / 1.8

TAR = ( TAEFF + 46C. ) / 1.8

KK = 0
                                                                                                                 00017
                                                                                                                 00018
                                                                                                                 00019
                                                                                                                 04020
                                                                                                                 06021
                                                                                                                 00022
                                                                                                                 00023
                                                                                                                 00024
   2489444 CUNVERTS FRUM ENG TO SCI UNITS
                                                                                                                 00025
       7.3 INCREASES EFFECTIVE LOADING TO BRING THEORETICAL BLOWOUT LIMITS IN LINE WITH EXPERIENCE
    17.3
                                                                                                                 00026
                                                                                                                 00027
         Y = PSI + 2489444. + 4.96
                                                                                                                 00028
         KK = 0
YU = 0.0
                                                                                                                 00029
                                                                                                                 00000
         ETAL = .999
ETAR = .7
                                                                                                                 00031
                                                                                                                 00032
         YL = PSICIETAL, UTF1, TF, TAK, PHLI
                                                                                                                 00033
     53 YR = PSICIETAR, DTF1, TF, TAK, PHI)
                                                                                                                 00034
         DELK = (Y-YL)/Y
                                                                                                                 00035
                                                                                                                 00036
         1+ (UELK155,00,54
                                                                                                                 00037
     54 ETAK = ETAR + .001
                                                                                                                 00038
         IFIYR .LT. YUIGO TU 998
                                                                                                                 00034
         YO = YR
                                                                                                                 00040
          60 10 53
                                                                                                                 00041
    55 ETAZ = -DELL * (ETAK-ETAL)/(DELR-UELL) * ETAL
Y2 = PSIC(ETAZ,UTF1,TF,TAK,PM1)
                                                                                                                 00042
                                                                                                                 00043
         DELZ = (Y-Y2)/Y
1F(ABS(UELZ)-.GG1)70,60,60
                                                                                                                 00044
                                                                                                                 00045
     oc IFIKK .GT. 100160 TO 999
                                                                                                                 00046
                                                                                                                 00047
         1F(DEL2+DELL .LT. 0.160 TO 65
                                                                                                                 00048
    ETAL = cTAZ
DELL = DELZ
GU TU 55
05 ETAK = cTAZ
                                                                                                                 00049
                                                                                                                 00050
                                                                                                                 10000
                                                                                                                 00052
```

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PRATT & HHITNEY AIRCRAFT DIVISION VER CSG.PAN757 10.0		12/07/78	PAGE	SERIAL
		11.33.02	114	021209
DELK = DELZ		00053		
Gu Tu 55		00054		
7C ETAN = ETAL		00055		
50 Tw = 1.6 * Tr - 460.		00056		
60 10 1066		00057		
C 944 WKITE(0,447)		00058		
C 957 FURMATI// * WARE EFFICIENCY LIERATION FALLED*//)		00059		
959 K = 1		00000		
GU 10 1006		00061		
C 996 wx11t(c,996)Y,Yk		00062		
C 996 FURMAT (***** WARE TIENATION FAILED ******/* A	KODYNA	MIL 00063		
C XLUADING EXCEEDS KINETIC CAPACITY 1/7X, AERUDYNAMIC LOAL	1NG =	• , 00004		
C XF12.4, GM-MULE/LITE ATM == 2 SEC 1/7X, KINETIC CAPABILI	TY =	. 00065		
C XF12.4, GM-MULE/LITRE ATM**2 SEC 1		00006		
990 K = 1		00067		
1000 KETUKN		99000		
END		00069		
***** ADUVE ACTION SATISFACTURILY COMPLETED ****				

## APPENDIX D COMPUTER PROGRAM TEST CASES

PRATI & WHITNEY ALKURAFT UIVISIUN CSG. PAN 757

VEK 10.0

12/07/78

PAGE

SEK1AL 021269

PANVALET
THE PROGRAM MANAGEMENT AND SECURITY SYSTEM

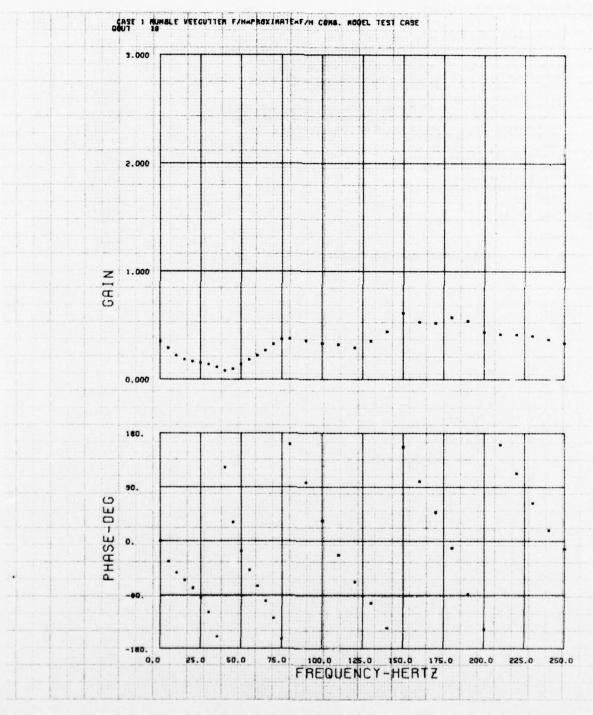
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PRATI & WHITNLY AIRCRAFT UIVISIUN CSG.PAN 157
                                                                     VEK
                                                                                12/01/18
                                                                                                 PAGE
                                                                                                            SEKIAL
                                                                    10.0
                                                                                10.35.37
                                                                                                            021264
            DATA SET BEBEFTUS AT LEVEL BUL AS OF $3/29/70
O LASE I NUMBLE VEEGUITER F/H+PRUXIMATE+F/H CUMB. MUDEL TEST CASE
                                                                                              00001
 SINPUT NUMBER , NAUGUPEL, NESUPEL, JEULLEL, NEKNIKEG, NERNIFEL,
                                                                                              (0(02
          NTL=1,NTH=1,EPSL=.U4U,EPSH=.U4G,FAV=.021,M6L=.15,M6H=.28,
                                                                                              00000
          r50=7.42,13n=1355.,
                                                                                              COC04
          ALPHAL=00., FAL=. U575, FMML=1.LO, LSC=4., NSL=1, PFSR=134.7.
                                                                                              00.05
          TFSK=500., TAUL=,250, TEX =-0., WEX T=0., ToL=700., XLL=60.,
ALPHAn=of., FAN=.04f, FNNn=.150, LSn=0., NSn=1, TAUN=.160, Ton=1775.,
                                                                                              66600
                                                                                              00007
          ALM=60., WLUUL=6.00, BPR=. >>, UPU=.004, UPM=.032, DPS=6., LA=82.,
                                                                                              80000
          Lb=6c., LL=72., LH=14., LZ=36., M6K=.22, PRNUZ=4.4, TCUKE=.005,
                                                                                              00009
 SENL
                                                                                              00010
           01/67
08/67
                      41/07
                                                                                              CCC11
 19
                                                                               ¿50 .
             1.
                          1.
                                             1.
                                                                                              CGG12
                                                                                              00013
                         8C.
                                                                                              00014
 40.0
                         250.
                                                                                              66615
                                                                                              00010
 .0.
                                                                                              COU1 7
                                                                                              COCIE
I CASE 2 KUMBLE VEEGUITER F/H#KEMUTE#F/H COMb. MUDEL TEST CASE
                                                                                              00017
 SINTUT NOUMUFEZ, NAUGUFEI, NESUFEZ, JEUELEI, NPRNTKEG, NPKNTFEG,
                                                                                              C002L
 SENU
                                                                                              00021
O CASE 3 NUMBLE VEEGUITER F/H#PKUAIMAIE#EMPERICAL#JP4#TAB&PLUT#TEST CASE
                                                                                              00022
 $1NFUT NCUMUP=1, NAUGUP=1, NFSUP=1, JFUEL=1, NPRNTK=0,
                                                                                              00023
         BPK= . 29 .
                    LA=82.,
                                            IOH=1/80.,
                                MoH= . 28,
                                                                                              00024
         UPU= . .... Lb=60.,
                                MOK = . . . .
                                             ZEFL=-5.5,
                                                                                              00022
                                4EFH= . ...
                                             TLOKE = . 605,
         DPH= . U32, LL=/2.,
                                                                                              00026
         UPS=0.,
                     Lm=14.,
                                LEPL=U.,
                                                                                              UCUZI
                     L1=5.,
         EIAL= . 4 ,
                                 LEPH= 0.,
                                                                                              00028
         ElAH - . 41,
                     LK=60.,
                                 LEIL=0 ..
                                                                                              00024
                                PKNU2=4.4, LETH=0.,
         FAC= . 0575, LSL=4.,
                                                                                              00030
                     LSH=8 . .
                                PS6=7. .
                                             ZEVL=U.
         FAH= . 04 .
                                                                                              00631
         FAV= . U21 ,
                                 100=760.,
                                            2 EVH= 6. .
                     L2=30.,
                                                                                              00032
         MEL = .15,
                                                                                              00033
 SEND
                                                                                              00034
           01/07
08/C7
                      41/07
                                                                                              00035
 19
             1.
                          1.
                                             1.
                                                                    0.
                                                                               250 .
                                                                                              00036
                                                                                              00037
                         25.
                                                                                              U0030
           2.5
                                                                                              00039
 80.
                                                                                              00040
 .01
                                                                                              (10041
                                                                                              00642
O CASE 4 KUMBLE VELGUTTER FIRTREMUTETEMPERICALTJP4TABEPLUTTEST CASE
                                                                                              00043
 SIMPUT NEUMOP=1, NAUGUP=1, NFSUP-2, JFUEL=1, NPRNTK=0,
                                                                                              00044
 SENU
                                                                                              U0045
08/67
           01/67
                       41/67
                                                                                              COC46
 19
              1.
                                                                    C.
                                                                               250 .
                                                                                              00047
                                                                                              00048
                         80.
                                                                                              00044
 90.
           10 .
                         250.
                                                                                              00056
                                                                                              00051
 .01
           -1.
                                                                                              00652
```

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PRATT & WHITNEY AIRCKAFT UTVISION
                                                          VER
                                                                    12/01/78
                                                                                  PAGE
                                                                                            SCHIAL
CSG . PANTST
                                                                    10.35.37
                                                                                            6,1,04
                                                                                00053
1 CASE > KUMBLE VEEGUTTEK F/H+PKUXIMATE*EMPEKICAL*JP5*TAB&PLOT*TEST CASE
                                                                                00054
$1NPUT NCUMUP=1, NAUGUP=1, NFSUP=1, JFUEL=2, NPRNTK=0,
                                                                                66655
SEND
                                                                               COC56
1 CASE O NUMBLE VEEGUTTER F/H*PRUXIMATE*EMPERICAL*JP4*PLOT UNLY*TEST CAS
                                                                                00057
SINFUT NCUMUP=1; NAUGUP=1, NFSUP=1, JFUEL=1, NPRNTK=1,
                                                                               00058
                                                                                10054
1 LASE 7 KUMBLE VOKBIX*PRUXIMATE*EMPERICAL*JP4*TAB&PLUT*TEST CASE
                                                                                00060
$1NPUT NCUMUP=1, NAUGUP=2, NFSUP=1, JFUEL=1, NPKNTK=C,
                                                                                00061
       ETA= . 85, FA= . 65, LK= 30., LEF= - . 04, LEFP= 0., LEP= 0.,
                                                                                00002
SEND
                                                                                CCCOS
1 CASE & KUMBLE VUKBIX*KEMUTE*EMPERICAL*JP4*TAB&PLUI*TEST CASE
                                                                                00064
$INTLI NCUMUP=1, NAUGUP=2, NFSUP=2, JFUEL=1, NPKNTK=0,
                                                                                00005
SENU
                                                                                00000
1 LASE Y KUMBLE SWIKL *PRUXIMATE * EMPERICAL * JP4 * TABEPLUT * TEST CASE
                                                                                00067
$1NPO1 NCUMEP=1,NAUGUP=3,NFSUP=1,JFUEL=1,NPRNTK=0,
ETA=.08, UPCS=.005, UPHS=.CC5, ZEF=-.b,
                                                                                00000
                                                                                000004
SEND
                                                                                00076
1 CASE 10 KUMBLE SWIKL * KEMUTE * EMPERICAL * JP4 * TAB & PLUT * TEST CASE
                                                                                00071
$1 m of neumer=1, Naugur=3, NrScP=2, Jruel=1, NPKNTK=0,
                                                                                00072
SENU
                                                                                00073
                                                                                00074
1 CASE 11 F/H CUMBUSTION MUDEL*JP4*FULL TAB+TESI CASE
DINPUT NUMUP=3, JFUEL=1, NPKNTF=1,
                                                                                00075
 PS6=15.. EPSL=.04.EPSH=.C4.M6L=.25.M6H=.25.NIC=10.
                                                                                C0076
        NTm=4,NSC(1)=2,2,2,2,2,2,3,3,3,3,NSm(1)=10,10,10,10,
                                                                                00077
        166(11=600.,076.,076.,070.,070.,116.,710.,110.,710.,710.,
                                                                                00070
        00075
        FHWC(1)=1.C5,1.05,1.C5,1.05,1.05,2.1,2.1,2.1,2.1,2.1,2.1,
                                                                                00086
        ALPHAC(1)=60.,60.,60.,60.,60.,70.,70.,70.,70.,70.,
                                                                                00081
        V01.82
                                                                                00083
        COC84
        00086
        10H=1660.,1666.,1716.,1716.,
                                                                                00687
        FAR=.656,.655,.050,.655,
                                                                                18000
        rnwn=.75,.75,.15,.15,
                                                                               CGC89
        ALPHAH= 60 ., 00 ., 01 ., 60 ..
                                                                                00090
        TAUH= .25, .25, .25, .25,
                                                                                00091
                                                                                00092
        L3m=6.,6.,6.,6.,
        XLm=66.,66.,66.,60.,
                                                                                00093
        MOL=.25, MOH=.25, FAV=.02, 13H=1360., WLUOL=.00, BPK=.54,
                                                                                60094
SENU
                                                                               COCYS
1 CASE 12 F/H CUMBUSTION MODEL*JPS*FULL TAB*IEST CASE
                                                                                00096
SIMPUT NEUMUP=3, JFUEL=2, NPKNIF=1,
                                                                                00097
 SENE
                                                                                00046
1 CASE 13 F/H CUMBUSTION MODEL WITH WARE HEAT AUD#JP4*FULL TAB*[ES] CASE
                                                                                60694
SINPUI NCUMUP=3, JPUEL=1, NPKNIF=1,
                                                                               JO100
        PSO=15., EPSC=.U4, EPSn=.04, MOC=.25, MOH=.25, NTC=10,
                                                                               U0101
        wln=4, NSU(1)=2,2,2,2,2,2,3,3,3,3,3, NSH(1)=10,10,10,10,
                                                                               00102
        WEAT(1)=.1,.1,.1,.1,.1,.1,.1,.1,.1,.1,.1,.1,
                                                                                00103
        TEXT(1)=3400.,3400.,3400.,3400.,3400.,3400.,3400.,3400.,3400.,
                                                                                00104
        346C.,
                                                                               00105
```

PRAIT & WHITNEY AIRCRAFT DIVISION CSG.PAN'57	VEK 10.0	12/07/78	PAGE	SEKIAL 041469
				021207
Tot (1)=000.,670.,070.,070.,010.,710.,710.			00100	
FA (11)=.040,.045,.050,.050,.045,.045,.050			10107	
FHWL(1)=1.05,1.05,1.05,1.05,1.05,2.1,2.1,	4.1,2.1,2.1,		00108	
ALPHAC 111=00.,00.,00.,00.,00.,40.,40.,40.			((010)	
TAUL(11)=.27,.27,.27,.27,.35,.27,.27,.35,.	35,.27,		00116	
LSC111=4.0,4.0,4.0,4.0,4.0,4.0,4.0,4.0,4.0,4.0	0,4.0,		00111	
XLL (11)=60.,00.,00.,00.,66.,66.,66.,66.,66.	.,66.,		90112	
Trans11=500.,500.,500.,500.,500.,500.,500.	.,500.,560.,566.,		00113	
PFSK(1)=250.,250.,250.,250.,250.,250.,250.,250.	.,250.,250.,250.,		00114	
Tonill=1000.,1000.,1/10.,1/10.,Ton=100.,	FAV= . 62 .		00115	
FAH(11=.050,.055,.050,.055,			00,10	
+nwn(1)=.75,.75,.75,.75			66117	
ALPHAH(1)=00.,00.,00.,00.,			30.16	
TAUH(1)=. 25,.25,.25,.25,			00119	
LSn(1)=8.,8.,d.,t.,			UU 12U	
XLH(11=00.,00.,00.,60.,			(0121	
WCULL=0.,			00124	
SENU			00125	
1 CASE 14 END UF JUB			00124	
\$INPUT			00125	
S10F=1.,			60126	
\$ENU			06127	
**** ABUVE ACTION SATISFACIONILY COMPLETED *****				



NUMBER MUDEL AITH VEGGOTTEN FLAMENGEDEN ADOMENTOR AND PROXIMATE FLOW SPEITTER USING FLAMENGEDEN COMBUSTION MUDEL COMBUSTION DATA

CASE I RUMBLE VEESUITER FINAPROAIMATE\*FIN LUMB. MUDEL TEST CASE

	-								
ARVING	X	174	**	. < 1000E-01	2	4	DEFAULT	VALUE	
NAKNING	- FANAMETER	JFUEL	#	-	15	4	DEFAULT	VALUE	
AKNING	- PANAMETER	Mol	11	***	57	4	DEFAULT	VALUE	
ARNING	- PANAMETER	HOH	"	.28000	13	4	DEFAULT	VALUE	
ARNING	- PARAMETER	NCORCE	"	,	2	4	DEFAULT	VALUE	
ARNING	- FARAMETER	PSC	**	7.9200	15	4	DEFAULT	VALUE	
MARNING	- PAKANETER	Dru	"	. 64660E-01	2	4	DEFAULT	VALUE	
MAKNING	- FARAMETER	CFS	11		15	4	DEFAULT	VALUE	
ARNING	- FANAMETER	LA	16	24.000	15	4	DEFAULT	VALUE	
ANNING	- PAKAMETER	رد	11	72.000	15	4	DEFAULT	VALUE	
ARNING	- PARAMLTER	5	**	14.000	15	4	DEFAULT	VALUE	
MAKNING	- PARAMETER	77	11	30.000	13	4	CEFAULT	VALUE	
MARNING	- PAKAMETER	MoR	11		15	4	DEFAULT	VALUE	
MANNING	- PARAMETER	NESCF	"	1	12	4	DEFAULT	VALUE	
MAKNING	- PANAMLTER	NERNIN	11	2	2	4	DEFAULT	VALUE	
ANNING	- PANAMETER	PRNUZ	11	4.4000	12	4	DEFAULT	VALUE	
ARNING	- PAKAMETER	ILURE	"	. 50000CE-02	15	4	DEFAULT	VALUE	
ARNING	- PARAMETER	NAUGUE	"	-	15	4	DEFAULT	VALUE	
MAKNING	- PAKAMETEK	UPH	"	.320005-01	15	4	DEFAULT	VALUE	
MARNING	- PAKAMETER	ALPHAC	11	000.00	12	4	DEFAULT	VALUE	
MARNING	- PAKAMETER	ALFHAH	11	070.00	15	4	DEFAULT	VALUE	
MAKNING	- PAKAMETER	crsc	11	.40000E-01	15	4	DEFAULT	VALUE	
MAKNING	- PAKAMETER	EPSH	11	. 40000E-01	15	4	DEFAULT	VALUE	
MAKNING	- PARAMETER	FAC	"	.5%>00E-01	15	4	DEFAULT	VALUE	
MAKNING	- PAKAME I -R	FAH	11	.40000E-01	13	4	DEFAULT	VALUE	
MARNING	- PAKAMETER	FHMC	11	1.0000	12	4	DEFAULT	VALUE	
MARNING	- PANAMLTER	THE	11	.Touch	2	4	DEFAULT	VALUE	
MAKNING	- PARAMETER	750	11	4.6660	15	4	DEFAULT	VALUE	
NANNAN	- PANAMETER	LSH	11	000000	15	4	DEFAULT	VALUE	
MARNING	- PARAMETER	NPRNIF	11	1	3	4	DEFAULT	VALUE	
MAKNING	- PAKAMETER	NSC	"	1.0000	15	4	DEFAULT	VALUE	
MAKNING	- PAXAMETER	NSH	18	1.0000	15	4	DEF AULT	VALUE	
MARNING	- PAKAMLTER	NTC	11	1.0000	13	4	DEFAULT	VALUE	
NAKNING	- PARAMETER	rIn	"	1.0000	15	4	DEFAULT	VALUE	
AKNING	- PANAMETEN	PFSR	"	154.70	15	4	<b>UEFAULT</b>	VALUE	
AKNING	- PAKANETER	TAUL	it	.25000	15	4	DEFAULT	VALUE	
MARNING	- PARAMETER	IAUH	"	.18600		4	DEFAULT	VALUE	
MAKNING	- PAKAMETER	1cx1	"	0.	15	4	DEFAULT	VALUE	
ARNING	- PAKAMETER	IFSR	11	500.00	2	4	DEFAULT	VALUE	
MARNING	- PAKAMETER	13H	"	1335.0	17	1	DEFAULT	VALUE	
ARNING	- PAKAMETER	Tec	ıı	700.007	57	4	DEFAULT	VALUE	
ARNING	- PANAMETER	161	11	1775.0	15	4	DEFAULT	VALUE	
ARNING	- PARAMETER	MEXT	11	7.	2	4	DEFAULT	VALUE	
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																										#	021583500E-40,	347+39200z+22,	444529115E+12		.804777163E+57	.140763343E-19	680>701>4E+70,	5110574011515414	.511009391E+30	.398+61950E+29	391200078E+22	158749451E+21	. 399999991E-01,	.47 1499009E+29.	.250154508E+29	1/80//283E+22;	14 (13519 (E-5) ()	040507535+66	.00+8+6781E+30	.447979930E+29		0	428829154E+22,	.135747415E-10;	428324750E+22,	
9												0.													.640000105E-01, DPH=	16718	83500	39200	29115	252490752.	7716	6334	7015	57 40	69391	0195	00078	4440	36665	20066	24200	1128	4100	24420	40781	79930	-, 720458984	470102310	29154	4/41	75165	2
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THIS PRUSAM CHECKS SPECIFIC INPUTS TO ENSURE REASONABLE INPUT DATA.

IF THESE CHECKS ARE NOT SATISFIED THE JUB WILL BE TERMINATED.

VIOLATIONS, IF ANY, WILL BE PRINTED BELOW—

## \*\* CUMBUSTION MODEL RESULTS \*\*

## FAN SIREAM

		PSIA	DEG R	O LESS	0.00		INCHES	D'LES	OEG PEG	A 5 5 6	ALC:	INCHES	DOLESS	0.1655	DEG R	DEG R			MICOON	2000	O'LESS		O.LESS	DILESS	D.LESS	DOLESS	DILESS	DEG R		FPS	D.LESS		DEG R		DEG R	DEG K	LBM/SEC	LBM/SEC
	-	7.9200	0000.000	2	0460-0	4610.0	1.0000	0.2560	00000	300.000	0000 · * ·	0000	00000	0.0	460.0000	700.0000	194	<u>.</u> .	114 6000		0.0	ON SOLUTION	0.1558	0.8900	0.3268	0.2059	0.1023	3203.4585	DING	0.1767	0.2004	EFFICIENCY	3429.1636	0.5118	1754.9304	2454.9304	0.1702	0.0129
11 11	INPUT	*	1001				W 1				H CES	1 ( ) ( )	*	EXT) =	- 11			TUNTOO	THOSE C. 1			MAKE COMPOSITION			"				FLAME SPREADING		"	STREAMTUBE EF	"			"		
STREAMTUBE TYPE NO. OF THIS TYPE		STATIC PRESSURE(PS6) ==	PPKUACH	E .	TATION FA KALIUITACI		STOCKED STATES	CANGE	S AS SHELT TENDITION	2 3	SZR FUEL PRESSURE (PPSK)	25	ALL PACE LEV						MEAN DECIDE OF CITE	77.5	FLASH VAPORIZATION	MAKE C	beta 1	LETA 2	DETA 3	_	WAKE F/A	WAKE TEMP		SPEED	INITIAL TURBULANCE	STREA	RISE	110N	AL TEMP			FLUWKATE - FUEL

## FAN STREAM SUMMARY

		- 3
EFFICIENCY	DOLESS	0.5118
FLOWRATE	LBM/SEC	0.1702
KATIU	DILESS	6450-0
TYPE		-
	RATIU FLOWRATE EFFICIENCY	TYPE KATIU FLOMRATE EFFICIENCY TEMP D*LESS LBM/SEC D*LESS DEG R

CONTRACTOR STATES CALLED	1	223110 0000 0	333100
COOLING PLOM/ ICIAL ENGINE PLOM	5	00000	0.1633
CHEMICAL COMBUSTION EFFICIENCY	ACY =	0.4014 D*LESS	D.LESS
THERMAL COMBUSTION EFFICIENCY	- 1	0.4217	DILESS
AVG COULING AIR TEMPERATURE	"	8666.669	DEG R
AVG STREAMLINE EXIT TEMP	"	2454.9292 DEG K	DEG K
AVG DUCT EXIT TEMPERATURE		2076.5789 DEG K	DEG K
TOTAL FLOWRATE	**	0.1702 LBM/SE	LBM/SE
AVG FUEL-AIR RATIO	"	0.0595	0.0595 D'LESS
AND TOCAL TOMOCDATION DICE		9 7310 0162 7767 -	0 000

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		PSIA DEG R	DILESS	INCHES	DEGREES	DILESS					DILESS			DILESS		DILESS	DEG R	DEG R	LBM/SEC	LBM/SEC
	10.	7.9200	0.2800	0.7500	0000-09	0.1860	8.0000	0.0400	745	10	0.1625	0.9973	1.3531	0.2143	1968.9004	0.8950	1762.1062	3537.1062	0.1907	0.0076
	INPUT	" "	# (HOI		= (HY)	" "	(LSH)=	= (HS	"	OUTPUT	ON COEF =	"	"	LEVEL=	"	= X3	RISE =	"	"	"
TUBE TYPE THIS TYPE		PRESSUR H TEMP (	Ia	DIM(FHWH)	EX ANGLETALPH	GE RATIO(TAUM	F/H DISTANCE (LSH)=	ENCE LEVELIEPSH)	YPE		ULATI	FFICIENCY	L FLAME SPEED	L TURBULENCE	TEMP RISE	STION EFFICIENCY	TEMPERATURE	TEMPERATURE	TE - AIR	1
STREAMTUBE NO. OF THI		STATIC	APPROAC FUEL AL	FAH 4101	F/H APEX	BLOCKAGE	S/R 10	UKOUL	FUEL I		WAKE K	MAKE E	ALTINI	INITIAL TUR	IDEAL	CUMBUS	ACTUAL	EXIT TEM	FLOWRA	FLUWRA

LUNE STREAM SUMMARY

STREAMTUBE FUEL-AIR MASS COMBUSTION EXIT IYPE RATIO FLOWRATE EFFICIENCY TEMP D'LESS LOM/SEC D'LESS DEG K 1 0.0400 0.1907 0.8950 3537.1062

M/B FUEL-AIR RATIUIFAV) = 0.0210 D'LESS
M/B INLET TEMP (T3H) = 1355.0000 DEG R
AVG EXIT TEMP = 5537.1052 DEG R
AVG CUMB. EFFICIENCY = 0.8950 D'LESS
TUTAL FLÜMRATE = 0.1907 LBM/SEC
AVG DISTANCE FROM = 0.046C D'LESS
SPRAYDAR TO F.HM = 8.0000 INCHES
AVG. IDEAL TEMP. RISE = 1966.9009 DEG R

-1.42647362 2EVC=						•	٠		•				5E-03,	1t-03,	207.14
24. 24. 74.	. MoT.					11.6862811	115.155665	25737.1528	281409175.	2037.18384		1.31454754	.337240355£-03,	.014093131E-U3,	0-19000001111
0765	0590					<b>±</b>		165 ,	27	. 203		. 1.3	-63.	63.	
•	1657.70650					Ξ	065	9	2	55		20	.374147460E-U3,	.638412777E-03,	
	• OTAB=					11.6862811	103.467590	23674.5586	.249334693	1707.64233		1.32624602	.3741	.6384	
-10H-		25	20				•	. 23				:	1 E-03	-03+	
1.23587799 F16H=	2480.00547	.171993417E-02	.118507980E-02			311	1219	2773	1146	9476		956	.419502147E-03,	.673753908E-03;	
095-999756 IC= 1.2358	2480	17199	11850			11.6882811	1516977.19	24109.2173	.220000029	1376.10083		1.34517956		•	
, F 2 E I C =	un on	. TAUDC=	, TAUDH=			-		, CH= 21	. = HM.	. HT.		,6H= 1.	ZE-63, ,ΤΑυFΗ=	ZE-03,	
** 16C=		. TAL	, TAL			*6*	8 6 4 0	31	52	2		2	.144840422E-03,	.226545162E-03,	
999714 , FIGCE 0'	.608267667	7777	9740			3.77927494	155.949969	21387.4531	.220000029 .35928226	1576-10063		1.29283810			
	3	3249.32227	20+1.86426			Ĩ.	. 55	١١٠٠ .		. 305				DE-02,	
, FLSH= 7.	100	• UT 10 =	=HI10.			90,000	00000	3	9	4756		10	02, .897300034E-03, .893075339E-04, .0	02, .121407490E-02,	
	*UE-U],	•	o.			10.0000458	150.220703	15504.4609	.149999970	967999756 96608.cc0c		1.29283810	2	1	
**************************************	32824	. 30 00800 02	scotlet40.				. 150			30.				1	
218791		• 30 00	.645			11	30.000000 .532425	4004	9976	9750		2167	190547	316613 77E-03	
	.2966.272136-03,1440= .472 10083 ,ThC= 3035.80935	**C*T=	= T. H.			36.00cc000 11.08c2511	30.0000	15504.4607	.331971761	699.999756		1.29684353	-	0	
75. 25.24	135-C		13	3	.000	•-		• •	•		9161	•:	•		
04.2200372	146.7	1376-06521	1627.4057	.540411121	0.0285510.	36.0000000 1.6882611	147	15504.4609	.149599976	047.999.9997 x0 70.72534	016141906.	1.38972187	AUF201705472E-02, UF201705472E-02, .3110261172-03, .287	AUG2731c6131c-02, .597265572c-03, .50c	***************************************
2013	100	9			110	36.00000 11.6882611	LJ = .0 126.844147 ND		00		_	1.30405001 ND	7	7 2	3
Fern Ceno	LIST EFANCE	CEND COREC	SENC SEAND	ZTFC.	ZTFH= ZTFH=	ENG LE	126 END	C= 77	E.S.	£13	PRHO	EEND EEND	TAUF= TAUF= .31	TAUG=	ETAUE.

RUMBLE MODEL WITH VEESUITER FLAMEMOLUER AUGMENTUR AND PROXIMATE FLOW SPLITTER USING FLAMEMOLDER COMBUSTION MOJEL COMBUSTION DATA

	FREGUE	FREGUENCY =	0.0 HEK 12	FRE JUENCY =	S.UU HEKTZ	FRECUENCY =	10.00 HERTZ	FREQUENCY =	15.00 HERTA
ARAMTER	ID NO.			GAIN	PHASE ANGLE	GAIN	PHASE ANGLE	GAIN	PHASE ANGLE
1	-	.255069	-300.000	.418740	-34.1054	.182294	-50.3910	.171140	-64.5300
1	2	490567	-100.000-	.218746	-214.105	.182294	-230.392	.171146	-244.530
1	•		-300.000	.218740	-32,1054	.182294	-50.3916	.171146	-64.5300
2	,	.287718	-360.000	.249424	-28.3434	.204561	-42.6515	.190812	-53.1768
2	^	.287718	-180.000	+04107.	-191.732	.250722	-193.302	.278754	-195.078
2	٥	.287716	-360.000	.239364	-35.4920	18181.	-56.1062	.140408	-69.9910
3	1	.287710	-300.000	200447.	-20.7900	.198569	-39.6173	.178380	-47.9918
•	۵	.287713	-180.000	·298034	-174.031	.544156	-170.374	691874.	-111.241
	•	.287713	.360.000	+16077.	-41.3459	.131355	-00.0047	.861653E-01	-50.4841
P3H	10	.287713	360.000	.244608	-20.7900	.198569	-39.6173	.176360	-47.9916
V3H	11	.287710	-180.000	446446.	-204-157	.199676	-214.366	1180611	-220.152
R3H	12		-360,000	.244480	-27.8871	.198154	-41.8098	144771.	-51.2763
PZH	13	.287716	-300.000	.244049	-27.5285	.198704	41.0946	.178651	-50.2085
VZH	14	.287713	-180.000	649447.	-267.529	.196764	-441.095	178651	-230.208
R2H	15	.287710	-360.000	649447.	-27.5285	.196704	41.0946	.170051	-50.2085
NIO	16	1.00000	-360,000	1.00000	-360,000	1.00000	-360.000	1.00000	-360.000
43	17	.130911E-06		1217667	-126.483	.324342	-147.965	.391204	-160.307
M3H	18	.880740E-16		.159359E-01	-117.702	.258683E-01	-131.446	.348461E-01	-140.736
TOO	1,4	350092		.289759	-34.2679	.219890	-53.0141	.183601	-65.4878
**	50	.300741	-300.000	504102.	-25.0030	.213440	-37.4983	.192995	-45.0012
1.	77	.306741	-140.000	115997.	-197.242	.229979	-201.392	.225984	-202.387
	22	.306741	-360.000	. 452518	-37.1202	.189316	-57.0406	.158791	-69.6204
	23	.306741	-366.000	.200941	-24.7556	.211927	-35.6496	.169918	-42.1426
•	5+	.306741	-160.000	.271.713	-191-223	.245430	-196.700	.254012	-188.712
85	25	.3067+1	-360.000	279545.	-38.2610	.170825	-59.0773	.128363	-70.0398
90	20	. 100013	-360.000	.254734	-25.1844	.205310	-36,1521	.182844	-42.4235
•	27	.106645	-180.000	.173109E-01	-211.486	.450147E-C1	-205.197	.512670E-01	-177.413
	28	.100134	-360.000	.146816	-97.2516	.176493	-138.640	.189220	-159.945
	5.4	.293950	-360,000	.248103	-25.6287	.198366	-36.6866	15455	-42.7550
_	30	.301521E-01		.731734E-UI	-343.175	.945817E-01	-11.6618	1779576-01	-37.7825
	31	.3085872-01		.203036	-143.269	.281673	-108.778	. 11174	-186.457
	32	.200057	-360.000	1+60+7.	-26.1093	.190968	-37,3026	.167572	-43.1963
84	33	.130642	-360.000	.168362	146.655-	.195999	-18.0765	.202867	-30.7041
RS	34	.131473	-180.000	. 281733	-161.302	.372724	-182.770	.409827	-200.982
64	35	.278579	-360.000	.233115	-26.6498	.182961	-38.0424	.158973	-43.8224
61	36	.208392	-360.000	1415-52.	-4.93779	.274681	-21.8905	.285272	-39.5164
89	37	.209529	-180.000	.350347	-170.714	669944.	-192.012	.488770	-211.645
P10	38	.269545	-360.000	294427.	-27.2799	.174162	-38.9718	104641.	-44.7284
V10	35	.271176	-300.000	.507106	-7.83800	.338207	-24.8991	.352072	-42.5472
01	04	.272845	-180.000	140804.	-176.864	.508228	-199.049	.554712	-220.251
11	4.1	.269545	-360.000	.224609	-27.3400	.174495	-39.2297	.149486	-45.2808
111	45	.271146	-360.000	.300405	-8.12162	.337411	-25.2598	.351906	-42.9642
	4.5	.272045	-180.000	974204.	-177.664	.507234	-200.496	.554480	-222.340
3	8/P3	7 1.00000	-180.000	1.21862	-147.841	1.73318	-130.757	2.40032	-123.224
-	1/43	7 .686525		. 694211	-5.31535	.918039	-10.77+3	644656.	-16.5383
11 4	41/P3	7 .936437	0.	.918486	549911	.878760	-359.612	.838020	-357.789

RUMBLE MITH VERBUTTER FLAMENDLUER AUGHENTUR AND PROXIMATE FLOR SPLITTER USING FLAMENDLDER CONBUSTION MADEL COMBUSTION DATA

C CASE I NUMBER		FRE CUENCY :	ACT OF THE PERSON	FRE UENCY =	25.00 HERTZ	FREQUENCY	= 30.00 HCRT2	FREQUENCY =	35.00 HERTZ
AMTER 10	NO.	GAIN	PHASE ANGLE	GAIN	PHASE ANGLE	GAIN	PHASE ANGLE	CAIN	PHASE ANGLE
		.171591	-74.5040	.180992	-94.3330	.207173	-110.517	.257226	-133.475
7		145171.	-255.303	.180992	-274.333	. 467173	-250.517	.257228	-313.475
3		.171991	-79.5840	.180992	-44.3330	.207173	-110.517	.257228	-133.475
*		.190030	-04.1710	.157705	-75.2081	.223199	-87.3808	.272715	-106.212
^		.46966.	7400.530	4344O4.	171.402-	.529062	-220.140	.738589	-236.896
0		.119611.	-14.403×	.104411	-00.3610	111111.	-70.1668	.171920	-83.7101
1		.108548	1576.06-	.103380	-04.49-	.167275	-72.4900	.187256	-85.5847
α		.530443	-177.012	.064430	-184.770	107278.	-195.228	1.20420	-212.850
,		.104654	-36.2740	.148552	-53.9674	168457	-80.6214	.147429	-116.291
P.3H 10		.108390	1070.00-	.163380	1064.49-	.109275	-72.4900	.187250	-85.5887
N. 11		.174150	-220.191	+10401.	-431.624	.177639	-237.197	177841.	-247.952
R3H 12		.166.992	160.7400	1471-1.	7846.69-	.166102	-75.0153	.182484	-93.1598
-		.10001.	4101.44-	.16+072	-63.1940	.170509	-70.9310	.180815	-90.7011
1		.160004	-234.534	.104072	-248.195	.170309	-256.931	.166615	-270.761
RZH 15		.168854	4105.94-	.164072	-68.1946	.170309	-76.4310	·188815	-90.7611
		1.00000	-300.000	1.00000	-300.000	1.00000	-360.000	1.00000	-360.000
		400450	-101.454	.583251	-173.894	.820606	-184.453	1.19638	-205-817
M3H 18		.438424=-01	1-150.637	. 221400E-01		7	01 -107.979	.851400E-C	-01 -181.989
4001 19		194551	-78.0454	.150852	-95.2781	150505	-118.982	.111539	-159.347
		.183562	25.0050	.179529	-59.4743	.189278	-66.4074	0.50512.	-78.2757
21		.238540	-204.405-	.203764	755907-	.310032	-213.830	541604.	-226.660
22		.156185	-80.4755	.161228	-45.1415	.180580	-116.712	.200305	-149.119
23		.17810+	-48.000+	.17102+	-54.1518	.177558	-59.2404	.198513	-69.2468
17		675617.	-169.029	.318243	-192.134	.386449	-146.774	.499126	-208.672
67		.107355	-81.0421	.908318E-01	1 -101.570	'n	-01 -144.081	.641471E-C	01 -244.512
20		.170627	-46.5630	163067	-53.2954	.169769	-57.2504	.192332	-66.1458
27		.776516E-C1	-174.900	.114011	-170.588	.177564	-185.408	.280392	-204.583
28		.204470	-175.711	6691670	-187.687	.263475	-207.467	474175.	-237.586
57		.102771	7805.84-	.155384	-52.5351	.161+96	-55.4530	.184965	-63.4209
30		.972534E-01	-02.6177	.103759	-90.9635	.126816	-126.589	.173940	-170.819
7		.25555.		.372037	-413.767	.418164	-231.678	.436019	-257.064
36		.154526	-48.0052	146337	-51.9033	.151982	-53.9360	.175274	-61.0358
3.5		.204232	1401.45-	055607.	-74.0546	.216960	-98.7191	.221481	-133.260
34		439436	-<16.327	.483232	-231.697	.539924	-250.347	.574301	-275.028
55		196441.	1144.84-	.135965	-51.7345	.140382	-52.7113	.162142	-58.8523
26		.2913+6	7604.06-	.302249	-74.0486	.318115	-94.8535	.321143	-121.698
57		.543424	-26.872-	1513907	-240.005	.640703	-265.837	00+880.	-290.675
20		.134696	1600.65-	.123758	-51.9176	1,5867	-51.7075	.144571	-56.6111
70		.362512	124.4961	+56976.	-76.6369	0403040	-92.9200	.416047	-119.400
1		.594526	-234.356	.651074	-258.088	.720551	-276.965	.785504	-304.200
41		.135800	-50.5522	.122106	-22.1108	.122447	-52.8781	.139259	-57.0916
7+		.303+15	-59.4245	.381709	-70.9815	246204.	-96.0964	.424363	-119.422
54		.595214	-242.022	.053571	-201.320	.731+69	-282.080	. 793719	-308.363
0/P.5	1	2.18550	-120.437	4.10049	-120.473	5.17559	-142.736	6.43079	-127.261
1/23	7	1.02155	-26.3070	1.10760	-24.8372	1.22388	-38.0274	1.37367	-47.8807
41/P3	1	.794544	-355.977	047747.	-348.614	.723361	-3+0.388	.743681	-331,503

RUMBLE MODEL MITH VEEGUITER FLAMEMOLVER AUGMENTUR AND PROXIMATE FLOW SPLITTER USING FLAMEMOLDER COMBUSTION MODEL COMBUSTION DATA

U CASE 1	RUMELE	VEESUTTER FINAS	F/H*PRUXIMATE*F/H	CUMB. MUDEL 1	TEST CASE				
		FREELENCY =	40.00 HENTZ	FREQUENCY =	45.00 HER12	FREQUENCY	= 50.00 HERTZ	PREDBENCY	= 55.00 HERT
ARAMTER	ID NO.	CAIN	PHASE ANGLE	OAIN	PHASE ANGLE	GAIN	PHASE ANGLE	CAIN	PHASE ANGLE
	1	.298+5+	-166.750	.290958	-200.571	.274043	-230.101	.257344	-259.760
	2	.298464	-346.730	954067.	-20.5707	.274043	-50.1006	.257344	-79.7603
	.7	.298404	-100.750	056067.	-400.571	.274045	-230.101	.257344	-259.760
	,	967016.	-135.25	146947	-164.699	.273734	184.097	.751200	-114.048
	•	244038	-208.082	1.01295	-294.488	1.03198	-326-386	1.03799	-353.644
	0	-244424	-110.447	141017	-143.440	.288267	-175-045	279005	-208.022
	1	197053	-106-650	.167210	-125.309	146484	-136.770	.137243	-147.025
	30	1-2005-1	-741.103	1.55323	-270.002	1.51509	-794-620	1-44794	-316.242
		-537568E-U	1 -140.100	.88329UE-01	1 -03.2050	170070	-100.911	200223	-144.810
H. C	10	192055	-106.656	.167216	-125.304	145484	-136.770	1117295	-147.025
77		202712	-266 775	15000	777	160056	-262 +31	150314	000 001
100		011007	100 411	301041	110000	200011	168.767	10101	100.000
	71	0.0001.	113.611	001001.	016.401	1000011	764-141-	111071	116 315
H74	13	0+1+61.	-117.590	170601.	131.990	044841.	-144.202	**10*1.	-155.212
V2H	*	0+1+61.	-294.590	176691.	-311.590	.148990	-324.202	.140144	-335.212
RZH	12	.194140	-117.590	175601.	-131.990	.148990	-144.202	.140144	-155.212
ZIO	10	1.00000	-300.000	1.00000	-366.666	1.00000	-360.000	1.00000	-300.000
#3	17	1.50474	-235.063	1.47493	-471.550	1.34469	-290.398	1.24881	-318.350
HSH	18	.99703dt-01	1 -203.980	.975551E-01	1 -223.537	-948493E-	-01 -235.901	4	-01 -247.056
1000	1.5	.761380E-U	1 -257.534	. 435610E-01	1 -329.066	.137842	-17.2599	.180001	0866.85-
**	20	.230159	-99.0735	.203638	-116.559	.188158	-151.859	176091	-144.394
	21	.490510	-250.230	.487071	-274.417	.464565	-294.109	.439463	-313.594
	22	.183555	-193.483	.122956	-230.852	.722171E-	-01 -208.892	.500991E-	-01 -292.02+
	23	.208060	-47.2534	.146215	-104.145	171437	-114.733	.105555	-125.420
	54	.590155	-230.947	.57+943	-255.290	.533450	-270.308	+97764.	-486.046
85	52	.141953	-345.172	197491.	-15.5328	.213685	-48.9592	.221851	-72.6799
94	50	.205055	-63.7038	.100035	-99.0582	.173605	-104.317	170947	-119.178
۸o	27	.376523	-234.753	.398964	-262.915	.395222	-202.004	.392413	-299.317
	27	.197313	-279.959	.631577E-01	1 -332,116	.512319E-	-01 -123.340	.121750	-154.477
	52	.200097	-80.3813	.184415	47.00.69-	.172381	-104.292	.172140	-113.293
	30	.220700	-219.929	.226775	-259.660	.225765	-284.085	.235891	-503.703
	31	.351238	-287.576	196404	-300.763	.135865	-201.783	.148150	-264.703
	32	150505	-77.3736	.176723	-41.8190	.166819	-99.4177	.158910	-107.000
	33	.185580	-177.845	.124774	-217.667	-928023E-	-01 -245-200	ü	-01 -269.316
	34	.493821	-302.862	.346883	-315.775	.300+35	-314.069	.301034	-316.242
	35	.176933	-74.4065	.164085	-87.8871	.156189	-94.3380	.160104	-101.743
51	36	.268317	-151.984	.191424	-109.956	.161642	-178.033	.153546	-188.743
89	37	041414	-317.715	.487156	-331.961	.453351	-337.223	.463152	-345.139
P10	38	.157430	-71.0345	.145714	-63.2116	.139054	-88.2957	.144685	-94.5331
0	39	.372169	-144.511	.306918	-159.25+	.240485	-168.664	.293416	-180.470
RIO	0+	.726883	-331.025	.007358	-340.534	. 586650	-355.281	.607265	-6.40342
1	41	.151546	-70.4034	.140156	-62.4539	.133700	-87.6166	.137974	-94.0488
111	42	165566.	-144.754	. 214089	-158.978	.303191	-108.198	.308033	-179.090
R111	4.5	.737069	449.564-	.614643	-351.679	.598751	917298	.621010	-12.4960
×3	8/83	7 7.85+15	-134.445	4.28411	-144.043	10.3431	-157.850	10.5401	-172,217
	1/83	7 1.55407	-60.0982	1.74032	-75.2610	1.87080	-42.5307	1.87458	-112,736
11	41/P3	7 .789.82	-324.306	.638207	-317.645	.912728	-311.047	1.00494	-307.024
					Contract of the Contract of th	The state of the s			

RUMBLE MODEL WITH VESSUTTER FLAMENGLUER AUSMENTER AND PROXIMATE FLOW SPLITTER USING FLAMEHOLDER COMBUSTION MODEL COMBUSTION DATA

RUMBLE									
CASE 1	RUMBLE	TIER F/	H*PRUXIMATE*F/H	-	TEST CASE				
	-	FREJUENCY =	60.00 HEK 12	FREJUENCY =	05.00 HER 12	FREQUENCY =	70.00 HERTZ	FREQUENCY =	75.00 HEK 12
AKAMIER	10 00	CAIN	PHASE ANGLE	CAIN	PHASE ANGLE	CAIN	PHASE ANGLE	CAIN	PHASE ANGLE
-	-	.232499	-233.340	.214945	-314.244	.213538	-341.609	.214384	-14.6540
_	2	.432499	-108.348	.21+945	-134.244	.213536	-161.669	.214384	-194.87
	~	.236444	-256.348	.214945	-314.244	.213538	-341.609	.214384	-14.8540
01	1	.221712	-230.347	.200125	-259.133	.194160	-281.217	150537	-308.849
O.	^	245554.	-20.1373	.969237	-44.0413	1.00655	-59.5985	1.04917	-100.998
2	٥	.242425	-240.000	.204455	-268.427	1719171.	-295.731	.137399	-323.297
P3	1	.132952	-157.440	1157477	-168.017	.154518	-185.110	.174227	-206.330
3	۵	1.30474	-342.504	1.19421	-4.83064	1.15378	-24.1454	1.11250	-50.5088
•	,	.156053	-185.508	.838384E-C	1 -209.705	.610661E-01	1 -177.811	.122439	-190.379
34	10	.132452	-157.440	1137477	-168.017	.154518	-183.110	.174227	-200-336
311	11	.158113	-309.447	.107740	-318.247	.193620	-331.659	.224378	-353.302
34	12	.123089	-170.092	.125534	-181.618	.139000	-197.631	.154204	-421.744
H	15	.130244	-100.385	.141485	-177.724	.159760	-193.582	181037	-217.578
I	1+	.13024+	-346.385	.141485	-357.723	.159760	-13.5818	161037	-37.5778
H	15	.136244	-100.385	.141485	-177.724	.159760	-193.582	181037	-217.578
N	16	1.00000	-360.000	1.00000	-360.000	1.00000	-360.000	1.00000	-360.000
	17	1.16700	-339.583	1.12000	898033	1.09939	-25.5574	1.02202	-55.0029
ı	18	.103031	-258.307	.115245	-269.837	.139273	-285.804	.167972	-309.914
TOL	15	.220307	-75.4.07	.206733	-100.305	.325593	-126.687	.372986	-163.003
,	20	.170930	-150.079	.173117	-168.922	.189445	-184.714	.208240	-207.899
1	21	.399510	-531.726	157175.	-340.910	151276.	-3.34437	.378105	-25.2207
4	22	.483367E-01	-328.333	.503085E-0]	1 -18.8755	-729105E-0	1 -73.7521	.889715E-0	11 -129.624
	23	.101437	-137.112	.103777	-146.877	.177285	-164.407	.196975	-187.127
	54	.442525	-299.342	.417207	-309.111	*43550+	-320.394	.470812	-338.139
	52	-241204	-93.5264	.271471	-117.154	.300580	-146.105	.302065	-180.074
	77	.106540	-150.186	.170859	-140.723	.183959	-154.058	.197095	-173.822
	27	.386120	-314.963	. 590505	-521.522	861144.	-329.224	.530651	-342.714
	28	.196772	-171.543	.279164	-190.612	.354733	-215.237	.388273	-238.567
	58	.171286	-123.490	161421.	-132.667	.188491	-143.913	.203817	-161.104
	30	.234853	-318.331	.243143	-324.772	.298088	-328.539	.403469	-340.880
	31	.198832	-250.880	.280+51	-263.651	.377985	-281.255	.45024.	-304.721
	32	.109609	-117.052	.173547	-125.057	.189579	-134.694	+61102.	-150.004
	3.5	.790508E-01	067-697-	. 950404E-6]	1 -283.703	.159995	-291.804	.255066	-315.037
R8	34	.325555	-317.337	.403440	-322.973	.511042	-338.178	.585125	717809
	35	.161423	-110.507	1000337	-117.057	.182729	-170.047	*505085	-139.850
	36	.157722	5+0.551-	.187923	-213.312	.237999	-236.743	.284302	-207.801
	37	377687.	-352.330	.572406	-1.09304	.699253	-16.5602	*80008*	-38.5934
0	36	.140808	-105.049	.150426	-109.222	.164931	-110.233	.182992	-128.278
0	55	.303508	-192.310	.340707	-205-804	.393032	-224.458	.431134	-248.561
0	04	.641323	-16.9125	.730031	-48.0848	.368567	-44.3228	.983858	-66.2578
P11	4.1	.139155	-102.007	.141241	-107.632	.154037	-113.670	.171573	-124.710
11	74	.321686	-141.267	.358466	-204.245	.413013	-227.252	*452724	-245.559
	43	+650474	-23.5047	.746602	-35.1265	.887191	-51.1254	1.00414	-73.4855
	0/63	7 5.85157	-165.129	8.08058	-194.819	7.46700	-201.035	6.38534	-204-232
	1/62	7 1.74874	-130.908	1.50350	-140.227	1.38190	-158.559	1.23048	-108.518
*	1/65	7 1.04004	-304.507	1.02738	-299.615	.996880	-290.560	.983620	-278.373

RUMBLE MODEL WITH VERGUTTER FLAMENDLOCK AUGMENTON AND PROXIMATE FLOW SPLITTER USING FLAMEMOLDER COMBUSTION MODEL COMBUSTION DATA

O CASE 1	1 RUMBLE VEESUITE	EESUTICK F/H#	K F/H*PROXIMATE*F/H	COMB. MODEL TEST CASE	FEST CASE	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	9	2 - 0 - 0 - 0 - 0 - 0 - 0 - 0 - 0 - 0 -	A SWEET STATE		
PARAMTER ID	A ID NO.				PHASE		PHAST	ANGLE		4	ANGIE
PI		.200760	-50.8403			0.			0.	0.	
٧١	2	.200760	-230.840	0.	0.	٥.	0.		0.	0.	
RI	2	.200700	-50.0403	0.	0.	0.	?		0.	0.	
P2	1	.174693	-339.005	0.	0.	0.	0.		0.	0.	
72	•	1.01350	-135.207	٥.	0.	0.	٥.		0.	0.	
R2	0	.103523	-343.750	0.	0.	0.	0.		0.	3.	
P3	1	.180409	-234.063	0.	0.	0.	0.		0.	0.	
V3	α	7+5066.	-70.5690	0.	0.	9.	0.		0.		
R3	,	153587	-234.535	0.	0.	0.	0.		0.	0.	
РЗН	10	*18040y	-234.003	0.	0.	0.	0.		0.		
<b>УЗН</b>	11	.238948	-19.5410	0.	0.	0.	0.		0.	0.	
КЗН	12	.156493	-250.520	0.	0.	0.	0.				
Р2Н	13	.188463	-240.079	0.	0.	٥.	0		0		
<b>У</b> 2H	14	.186463	-66.0741	0.	•	2.	0.		0.	0	
RZH	15	.188463	420.042-	0.	0	0.	0.		0.	0	
NIO	16	1.00000	-360.000	0.	0.	0.			0.	0	
H3	11	2049600	-63.5540		0.	0.	0.		0.	0.	
W3H	18	.185196	-336.500	9.	0.	0	0		0.	0	
1000	19	.376049	-190.654	0.	0.	0.	0		0.	3	
+4	2.0	.211614	-235.075	0.	0.	0.	0		0.	0	
٧٠	21	.301460	-49.1155	0.	9.	0.	0.		0.	0	
R4	22	.897218E-01		0.	0.	0.	0		0.	0	
P5	63	.188965	-213.574	0.	0.	0.	0.		0.	0.	
45	4.7	.484.51	-359.927	0.	0.	0.	0.		0.	0	
RS	42	.266334	-212.303	0.	0.	0.	3.		0.	0.	
Po	20	.192907	-190.633	0.	0.	0.	0.		0.	0	
94	27	.603510	618992	0.	0.	0.	0.		0.	0	
R6	28	.302580	-260.297	0.	0.	0.	0.		0	0.	
P7	5.8	.201291	-181.103	0.	9.	0.	0.		0.	0.	
77	30	.501413	-354.434	0.	0.	0.	0.		0.	0.	
R7	15	86+504.	-340.483	0.	0.	0.	0.		0.	0.	
88	32	.208616	-167.762	0.	0.	0.	0.		0.	0.	
9	33	.335326	-344.142	0.	0.	0.	0.		0.	0.	
88	24	154616.	-23.3053	0.	0.	0.	0.		0.	0.	
64	35	760507.	-155.805	?.	0.	0.	0.		0.	0.	
6>	36	.305212	46.642-	0.	0.	0.	٥.		0.		
89	37	.812411	-61.1350	0.	0.	0.	0.		0.	•	
P10	20	.188+77	-142.221	0.	0.	0.	0.		0.	0.	
010	2.7	+75834.	-273.127	0.	0.	0.	0.		0.	•	
R10	10	1.06467	-88.7353		0.	0.	٥.		0.	0.	
PIII	41	.177723	-137.837	0.	0.	0.	0.		0.	0.	
111	745	1716++-	-269.32+	0.	0.	0.	0.		0.	0.	
KII	4.5	1.02405	-40.1718		0.	0.	0.		0.	0.	
	0/P3	1 2.40090	-204.900	٥.	٥.	0.	٥.		0.	0.	
PI	1/63	7 1.11201	-170.177	0.	0.	0.	٥.		0.	0.	
	41/P3	7 .985114	-263.773	0.	0.	0.	0.		0.	0.	

RUMBLE MUDEL WITH VEEGUITER FLAMENULVER AUGMENTUR AND PROXIMATE FLOW SPLITTER USING FLAMENULDER COMBUSTION MODEL COMBUSTION DATA

RUMBLE										
O CASE 1	RUMbLe	VEEG	UTTEN FIN	VEESUITER F/H*PROXIMATE*F/H	CUMB. MUDEL	TEST CASE				
ADAMTED	10 60		FREQUENCY	BASE DERIC	FRECCENCY	=100.00 HERTZ	FRECUENCY	PHASE ANGLE	FREDUENCY	=120.00 HEKTZ
-			171-14	-121 087	147540	-188-857	158510	-251-460	166922	-513-810
	• •		171434	18.1 087	147546	- x x 200	158510	-71.4501	166922	-133.810
	<b>1</b> (*		171444	100.100	147540	-15 H A 1-1	158510	-251-460	166922	-313.410
	1 4		144130	1501 23	2441	2641 601	130661	-141.777	140140	-191
			27747	-202 312	70007	-264.973	455662	-176-494	882 364	-25.7519
	1 0		106012	-14-1054	135644	-74-4763	165010	-143.265	152064	-211.069
	, -		174205	616-062-	164844	-347.436	177400	-35.4080	.174432	-90.5651
	α		.752456	-130.824	**8065.	-175.371	.633102	-212.195	.728301	-251.120
	5		14	-ul -sus. y14	840121.	-319.403	115661.	-38.9764	.131469	-120.439
РЗН	10				104344	-247.436	.177400	-39.4080	.174452	-90.5051
VSH	111		.250055	-73.7050	.245364	-127.647	.280374	-111.112	.292865	-227.187
R3H	12		14041.	-300.747	.131844	-6.62180	.134898	-59.0640	.125343	-111.568
PZH	15		.186361	-204.200	.176553	-2.60460	.192810	-56.1909	.192676	-108.993
V2H	1,		.186361	-124.500	.176553	-182.604	.192810	-236.191	.192676	-286.993
KZH	15		.locobl.	-304.500	.170553	-2.00400	.192810	-50.1909	.192670	-108.993
OIN	16		1.00000	200.000-	1.00000	-300.000	1.00000	-360.000	1.00000	-360.000
M3	17		.656712	-131.811	2497960	-143.580	.435821	660.607-	115059.	-242.299
M3H	18		.205023	-37.1299	.209803	-95.3502	.247359	-149.013	.264140	-201.845
1000	1.4		100056.	-262.946	.352507	-326.462	.322828	-24.0604	.292426	-68.5778
P.+	50		.205052	-290.581	.180672	-340.007	.202592	-36.3947	.20270	-66.0349
**	17		.331210	1171.14-	.3101%	-145.444	.359873	-189.988	.39936.	-236.275
R4	22		-6995346-	01 -257.150	H	-01 -310.533	.102157	-38.6934	u	-01 -128.218
	23		.171414	-200.130	.144739	-318.401	.142102	-3.43343	.130875	-45.1670
45	54		.567670	-40.5530	.513295	1626.66-	.606285	-142.515	.658073	-189.848
	25		.229+73	-261.738	.182242	-350.724	.153232	1.89051		1
P6	97		.163984	-241.555	.124025	-283.274	.109386	-320.063	u	-01 -355.207
94	2.7		.700344	-38.35%	8++660.	-70.8454	.710072	-114.921	.626983	-156.558
Ro	28		.270020	-292.430	.156733	-303.136	.174410	-290.938	.187293	-283.359
	53		.174142	-217.136	.138085	-247.606	.130366	-274.183	.127370	-305.837
	30		920449.	-36.3182	.698324	-70.2654	.743257	-110.454	.693764	-145.862
	31		.320898	-358.771	676121.	14050-7-	.202331	-347.812	.297865	-345.668
	35		19141.	-197.926	.168931	-223.137	.177320	-247.133	.179745	-278.442
88	33		140094.	-28.8607	.500538	-71.4313	761156.	-106.154	.528673	-141.393
	34		.504244	-01.1685	.329983	-88.6182	.252214	-95.7035	.218486	-82.5866
64	35		.200124	-182.057	.132429	-205.373	.214792	-229.548	.220744	-200.867
64	30		.326447	1350.097	. 201001	-43.5000	.302729	-80.2359	.205050	-115.082
89	37		.761528	-99.4117	.602378	-130.585	.553015	-152.210	.473572	-169.024
P10	38		.194670	-165.012	.200873	-187.864	.231043	-213.021	.235974	-244.585
0	39		.390426	-316.961	.311634	-352.255	.291824	14.8441	.268133	-43.0755
0	0+		.90+200	-127.793	.820118	-159.183	.810475	-184.599	.765748	-208.590
P11	41		.187782	-159.540	197067	-182.513	.227367	-207.836	.230203	-239.394
V11	74		.405778	-511.222	.322698	-343.940	.304914	-9.12527	.290455	-31.0825
_	43		.980922	-136.433	.834566	-168.253	.828398	-194.177	.791150	-219.015
	6/P3	1	4.22160	-199.905	3.58429	-187.935	3.56878	-172.787	4.17528	-160.554
PI	1/23	1	.962003	-190.167	790569.	-201.421	.893521	-217.052	.956948	-223.245
	41/P3	1	1.05374	-228.621	1.19548	-195.078	1.28166	-168.428	1.31973	-148.829

RUMBLE MUDEL WITH VERSUITER FLAMEHULVER AUGMENTOR AND PROXIMATE FLOW SPLITTER USING FLAMEHOLDER COMBUSTION MODEL COMBUSTION DATA

Colored   Colo	O CASE	I KUMBLE VEEGUITER	Z	CY =130.00 HERTZ	FREQUENCY	=140.00 HER12	FREQUENCY	=150.00 HERTZ	FREQUENCY	=160.00 HERTZ
2         CUBBLE - 10,54986 - 10,011 - 125,572 - 116005 - 116,1017 - 122,191         -10,1017 - 122,191         -10,1017 - 122,191         -10,1017 - 122,191         -10,1017 - 122,191         -12,1017 - 122,191         -10,1017 - 1	PAKAMTE	10		PHASE ANGLE		PHASE ANGLE		PHASE ANGLE		PHASE ANGLE
22082158.25028017 -225.77 110505 -101.01722191221912218229822	1.		.208625	-8.54980	118087	-75.2725	316505	-161.017	161625.	-232.718
3         .158928         -2.54946         -2.50474         -10100         -4.57542         .158209         -4.57542         .158209         -4.57542         .158209         -4.57542         .158209         -4.57542         .158209         -4.57542         .158209         -4.57542         .158209         -4.57542         .158209         -4.57542         .158209         -5.58418         -158818         -168818	1	2	.208626	-180.550	.280817	-255.272	.316505	-341.017	161527	-52.7176
1,09719	-	•	.208828	-0.54960	.280817	-75.2723	.310505	-161.017	161422.	-232.718
1,000,119   -17,000   -140,001   1,000,00   -150,000	2		.181354	-233.404	++1+57.	-289.249	.301109	-4.52542	-224442	-66.5768
184540	2	5	1.05719	-77.2052	1.32900	-140.521	1.36269	-222.443	.854159	-289.661
1,000.044.5	2	0	.128031	-257.724	.149328	-284.337	.262016	-350.829	.239860	-65.3020
10,00442	3	2	.189350	-132.669	.205658	-180.907	.182765	-239.591	.119934	-273.932
9         9         1947094 (1)         118709         188.003         188.17 (1)         139931         118993<	3	0	1.02442	-267.419	1.51205	-339.450	1.78176	-55.5446	1.24812	-114.673
118439	3	,	44		.184453	-182.663		_	155037	-255.098
133793	34	27	0		BC0507.	-180.907	.182765	-239.591	.119934	-273.932
12	34	11	.337793	-267.201	.389830	-314.781	.368081	-14444	.256593	0066-54-
1,	34	12	.127785	-153.401	.129568	-201.984	.106932	-259.687	-644340E-	-01 -292-128
14	2H	13	.212893	-152.178	.235729	-202.736	.213909	-203.183	.143566	-299.338
15	2H	14	.212895	-534.178	.255729	-24.7359	.213909	-82.1832	.143566	-119.339
10   1,00000	2H	15	.212693	-152.178	.235729	-202-736	.213909	-203.183	.143566	-299.338
17.2293   1.72	Z	16	1.00000	-300.000	1.00000	-360.000	1.00000	-360.000	1.00000	-360.000
18         .30203         -244.980         .300014         -295.403         .341264         -355.649           19         .525343         -103.78a         -445.31         -147.141         .501631         -20.939         .56960         -34.889           20         .501534         -125.937         .64213a         -126.939         .65380c         -34.889           22         .336477         -15.26         -126.249         .135434         -65.80c         -35.607           23         .38270         -229.36c         -925.38         -26.334         -65.86c         -91.233         -65.80 <td>9</td> <td>17</td> <td>750169.</td> <td>-286.407</td> <td>1.34453</td> <td>-336.328</td> <td>1.72293</td> <td>-53.2258</td> <td>1.13295</td> <td>-119.675</td>	9	17	750169.	-286.407	1.34453	-336.328	1.72293	-53.2258	1.13295	-119.675
19         .393643         -103.756         .443231         -145.141         .612631         -203.523           20         .225774         -126.700         .224798         -26.939         -553604         -24.5892           21         .306.77E-01         -126.700         .226.434         -26.939         -53560         -44.8892         -25.800           23         .138270         -75.2660         .101182         -112.468         .170800         -105.192           24         .784390         -227.2109         -201.22         -27.209         -106.208         -108.00           25         .12050         -227.2109         -201.20         -106.208         -109.10         -109.20           26         .12050         -107.379         -26.209         -196.609         -196.609         -196.609           27         .15436         -26.309         -20.209         -20.208         -196.109         -20.208           28         .258749         -23.309         -20.209         -20.208         -20.208         -20.208           29         .15436         -26.209         -20.209         -20.209         -20.208         -20.208           29         .15436         -17.229         -20.207	34	18	.309203	-244.980	.300014	-295.403	.341264	-355.649	.237865	-31.5299
20	TUC	13	.353633	-103.758	.443231	-145.141	.612631	-203.523	.530200	-260.837
22	•	70	.225774	-120.700	. 224798.	-174.982	.24042	-235.607	.150030	170.572-
22 376477E-01 -193.467 . 506133E-01 -266.249 . 115434 - 6511925 . 138270		77	56105.	168.617-	.042130	-326.939	.653866	-34.9896	.402203	-84.2055
23 .138270		22	w		-568133t-		.135434	-63.1925	.128803	-160.339
24       .784390       -227.364       .925738       -277.691       .866649       -359.465         25       .231533       -109.347       .204734       -166.208       .275198       -26.2092         26       .103605       -196.609       .653717       -256.209       -196.209       -196.209         27       .618602       -196.609       .653717       -256.209       -196.209       -196.209         28       .356749       -296.633       .50734       -26.3969       .216366       -91.135         29       .154358       -338.628       .200273       -26.3969       .216366       -91.135         29       .6693452       -7.3297       .794044       -46.6769       .829257       -106.243         31       .565926       -7.3297       .794044       -46.6769       .829257       -106.243         31       .594282       -107.570       .583465       -198.011       -178.245         32       .47881       -107.570       .583465       -198.011       -178.245         34       .471029       -132.601       .245677       -356.095       .241018       -26.104         35       .277023       -132.800       .36515       -161.130	•	23	.138270	-75.2860	.161162	-112.468	.170800	-166.807	118951	-208.230
25		54	.784390	-559.364	.925738	-277.691	.868649	-359.465	.529459	-17.4330
26 .120505 -25.2109 .107839 -04.1059 .196910 -124.822 .2510504 .2550.216 .001364 -319.280 .3550.218 .201364 .3550.219 .201364 .3550.219 .201364 .3550.219 .201364 .3550.219 .201364 .3550.219 .201364 .3550.219 .2540.25 .401389 .266365 .911.1335 .266362 .176.334 .669385 .215.009 .2550.93 .266366 .911.1335 .266362 .176.334 .669385 .215.009 .2550.93 .266362 .911.1335 .266362 .310.212 .2450.99 .2550.93 .266.759 .266.759 .266.759 .266.759 .266.759 .216.019 .245.300 .241018 .245.245 .241018 .245.245 .241018 .245.245 .2560.30 .2560.30 .2560.30 .2560.30 .366312 .161.130 .445267 .213.219 .266361 .213.219 .266361 .213.219 .266361 .213.219 .266361 .213.219 .266361 .213.219 .266361 .213.219 .266361 .213.219 .266361 .213.219 .266361 .236.2443 .256361 .236361 .236364 .24631 .2263440 .2267.473 .246344 .2267.473 .2263440 .2267.473 .246344 .2267.473 .226432 .173.754 .356.789 .173.754 .356.789 .173.754 .173.754 .173.754 .256.360 .256.360 .1263.24 .256.36		52	.231533	-109.347	.20473+	-166.208	.275198	-205.092	.124441	1908elE-01
28		56	.120505	-23.2109	.107839	6505.40-	.196910	-124.822	.130562	-107.211
28		27	709819.	-196.809	117569.	-250.216	.001364	-319.280	651604.	-4.49621
29 .154358		28	.356749	-296.032	.507488	-335.119	.540525	-40.3683	.198855	-100.541
30		53	.154358	-338.628	.200273	-56.3969	.216386	-91,1335	.144500	-132.721
31 .545929 -7.32957 .794044 -46.6169 .829257 -106.243 32 .201861 -310.212 .245677 -356.095 .241018 -58.2004 33 .534282 -167.570 .684605 -126.014 .604985 .241018 -58.2004 34 .413790 -87.6028 .642193 -122.218 .686111 -178.245 35 .250630 -291.068 .284922 -333.741 .268712 -31.4306 36 .257023 -182.800 .286515 -131.30 .452657 -213.671 37 .592293 -181.190 .785820 -213.279 .811706 -267.473 38 .260507 -273.601 .285520 -313.470 .261963 -6.85002 39 .259095 -6.551190 .447216 -103.924 .467214 -358.247 41 .250906 -267.134 .13392 -207.437 1.17812 -322.473 42 .250906 -267.734 .71749 -366.240 .249146 -358.237 43 .296340 -242.410 1.20850 -280.618 1.21994 -336.237 44 .296120 -155.150 7.55288 -128.522 9.74892 -173.754 1/P3 7 1.10287 -236.460 1.36546 -256.365 1.73176 -281.426		30	.684362	-176.534	\$85699.	-215.009	.551093	-266.759	.330653	-297.873
32 .207861 -310.212 .245677 -356.095 .241018 -58.2004 .3534282 -167.570 .583465 -198.612 .004985 -243.305 .341790 -87.028 .264292 -198.612 .004985 -243.305 .341790 -87.028 .264292 -333.741 .268712 -13.4306 .250636 -297.068 .264292 -333.741 .268712 -31.4306 .36515 -161.130 .452657 -215.671 .356293 -181.196 .785832 -213.279 .811706 -267.473 .285520 -31706 .267343 -6.85002 .349695 -6.85002 .249146 -161.198 .526906 -267.1190 .447216 -103.924 .464514 -161.986 .267.473 .215.074 .266260 -267.1749 -306.260 .249146 -356.2473 .267640 -242.410 .269355 -93.6551 .496120 -151.516 .496355 -93.6551 .496120 -151.516 .356.289 .158.522 9.74892 -173.754 .173.754 .173.754 .261.426 .256.365 1.73.754 .256.365 1.73.754 .256.365 1.73.776 .256.365		31	.545929	-7.32957	140461.	46.6769	.829257	-106.243	.396824	-133.471
32 .534282 -167.570 .583465 -198.612 .604985 -243.305 34 .413790 -487.6028 .6042193 -122.218 .6045111 -178.245 35 .256030 -291.608 .264922 -333.741 .264512 -313.426 36 .277023 -132.800 .366515 -161.130 .452657 -213.671 37 .592293 -181.196 .785820 -313.470 .261963 -6.835002 38 .2560507 -273.601 .447210 -103.924 .464514 -161.986 40 .927580 -267.130 .447210 -103.924 .249146 -358.237 41 .250906 -267.132 .271749 -366.240 .249146 -358.237 42 .37206 -267.132 .249146 -358.237 43 .963440 -242.410 1.26268 -158.222 9.74892 -173.754 8/P3 7 5.41020 -155.150 7.55228 -158.222 9.74892 -173.754	_	32	108705.	-310.212	.245677	-356.095	.241018	-58.2004	.153915	-97.0341
34 .413790 -87.6028 .642193 -122.218 .686111 -178.245 35 .256030 -291.068 .266422 -33.741 .268712 -31.4306 36 .277023 -132.600 .765452 -33.3741 .268712 -31.4306 37 .29293 -181.196 .78582 -213.279 .811706 -267.473 38 .260567 -273.601 .285520 -313.470 .261963 -6.85002 39 .256067 -273.601 .285520 -313.470 .261963 -6.85002 40 .927580 -267.190 .447216 -103.924 .464514 -101.986 41 .250906 -267.734 1.17812 -322.473 42 .396060 -267.734 .71749 -366.240 .249146 -358.237 43 .396070 -242.410 1.20850 -280.618 1.21994 -386.785 43 .496120 -155.150 7.5528 -158.522 9.74892 -173.754 44 .946121 -256.460 1.36546 -256.365 1.73176 -281.426	_	33	.534282	-167.570	.583465	-198.612	\$86409	-243.305	981444.	-275.998
35 .250630 -291.068 .264922 -333.741 .268712 -31.4306 .366515 -161.130 .452657 -215.671 .268712 -31.4306 .366515 -161.130 .452657 -215.671 .285293 -181.196 .386515 -161.130 .452657 -215.671 .285293 -181.196 .47832 -313.470 .261963 -6.85002 .39 .39695 -55.1190 .447216 -103.924 .464514 -161.986 .40 .927580 -230.592 1.16396 -267.437 1.17812 -322.473 .250906 -267.132 .271749 -306.240 .249146 -352.473 .372206 -24.21212 .485355 -93.6551 .496120 -151.516 .36779 .36.785 1.21994 -336.785 1.75528 -158.522 9.74892 -173.754 1.75528 -158.522 9.74892 -173.754 -281.426 .254.365 1.73176 -281.426	•	34	.413790	-87.0028	.642193	-125.218	.686111	-178.245	.372721	-197.010
36 -277023 -132.600 .366515 -161.130 .452657 -213.071 37 .99293 -161.196 .785832 -213.279 .811706 -267.473 38 .2660601 -273.601 .447216 -103.924 .464514 -161.986 40 .927580 -230.594 1.10396 -207.431 1.17812 -322.473 41 .250906 -267.134 .271749 -306.240 .249146 -358.237 42 .372206 -247.132 .485355 -93.6551 .496120 -151.516 43 .963440 -2242.410 1.26528 -158.522 9.74892 -173.754 1/P3 7 1.10287 -236.460 1.36546 -254.365 1.73176 -281.426		35	.250030	-291.068	.284922	-333.741	.268712	-31.4306	.168648	-60.1097
37 .592293 -181.196 .785832 -213.279 .811706 -267.473 28 .260667 -273.601 .285520 -313.470 .261963 -6.85002 39 .339695 -65.1190 .447216 -103.924 .464514 -101.986 40 .927580 -267.134 1.10396 -267.437 1.17812 -322.473 41 .250906 -267.134 .271749 -366.240 .249146 -358.237 42 .37206 -267.134 .485355 -93.6551 .499120 -151.516 43 .963440 -242.410 1.26280 -280.618 1.21994 -336.785 8/P3 7 5.41020 -155.150 7.55228 -158.522 9.74892 -173.754 1/P3 7 1.10287 -236.460 1.36546 -254.365 1.73176 -281.426	•	30	.277023	-132.800	.366515	-161-130	.452657	-213.071	.31,877	-253.638
38 .260001 -273.001 .285520 -313.470 .201903 -6.85002 39 .339095 -05.1190 .447210 -10.394 .404514 -10.1986 40 .927580 -230.594 1.10396 -267.437 1.17812 -322.473 41 .250906 -267.734 .271749 -306.240 .249146 -358.237 42 .372206 -24.1214 .485355 -93.6551 .499120 -151.516 43 .96340 -242.410 1.20850 -280.618 1.21994 -336.785 8/P3 7 5.41020 -155.150 7.5528 -128.522 9.74892 -173.754	•	37	.592293	-181-198	.785832	-213.279	.811706	-267.473	.455403	-293.101
39 .339095 -05.1190 .447216 -103.924 .464514 -101.986 40 .927580 -230.592 1.10396 -207.437 1.17812 -322.473 41 .250906 -267.732 .271749 -93.6551 .499120 -151.516 42 .372206 -24.7212 .485355 -93.6551 .499120 -151.516 43 .963440 -242.410 1.20850 -280.618 1.21994 -336.785 8/P3 7 5.41020 -155.150 7.35228 -158.522 9.74892 -173.754 1/P3 7 1.10287 -236.480 1.36546 -254.365 1.73176 -281.426	0	38	.260001	-473.001	.285520	-313.470	.261963	-6.85002	.164892	-37.4825
40 .92789	01	39	.339095	-65.1190	.447210	-103.924	+15404.	-101.986	*88767°	-192.916
41 .259906 -267.732 .271749 -306.240 .249146 -358.237 .42 .372206 -24.2121 .483355 -93.6551 .490120 -151.516 .43 .963440 -242.410 1.20835 -280.618 1.21994 -336.785 .6793 7 5.41020 -155.150 7.35228 -158.522 9.74892 -173.754 .173.754 .173.754 .254.365 1.73176 -281.426	07	40	.927580	-230.592	1.10396	-207.437	1.17812	-322.473	.742150	-351.651
42 .372206 -24.1212 .485355 -93.6551 .496120 -151.516 .4 43 .496340 -242.410 1.20850 -280.618 1.21994 -336.785 .8 6/P3 7 5.41020 -155.150 7.55228 1.78892 -173.754 1 1/P3 7 1.10287 -236.460 1.36546 -254.365 1.73176 -281.426 1	==	4.1	•250906	-267.132	642127	-306.240	248146	-358.237	.156335	-28.2508
43 .963440 -242.410 1.20850 -280.618 1.21994 -336.785 8/P3 7 5.41020 -155.150 7.55228 -128.522 9.74892 -173.754 1.10287 -236.480 1.36546 -254.365 1.73176 -281.426 1.	=	45	.372206	-24-1212	.485355	-93.6551	. 490120	-151.516	.313882	-161.770
1/P3 7 1.10287 -25.480 1.35546 -254.365 1.73176 -281.426	-	43	.963440	-245.410	1.20850	-280.618	1.21994	-336.785	.770858	-6.95864
1/73 ( 1.1028/ -2.30.480 1.30546 -254.365 1.73176 -281.426		8/83	7 5.41020	-155.150	7.35228	-128.522	9.74892	-173.754	10.4067	-200-741
	-	1/2	1.10287	-236.480	1,30546	-254.365	1.73176	-281.426	1.87762	-318-786

RUMBLE MODEL WITH VEESSITER FLAMEHOLDER AUSMENTON AND PROXIMATE FLOW SPLITTER USING FLAMEHOLDER COMBUSTION MUDEL COMBUSTION DATA

O CASE 1	RUMBLE	RUMBLE VEGUTTER F/H*P	F/H*PhOXIMATE*F/H	_	TEST CASE				
		ENCY	=170.00 HERTZ	5	=160.00 HERTZ	2	=190.00 HEKIZ	5	=200.00 HEKIZ
ARAMTER	10 NO.	GAIN	PHASE ANGLE	CAIN	PHASE ANGLE	CAIN	PHASE ANGLE	CAIN	PHASE ANGLE
-	-	.189894	-299.508	.173041	-7.71480	.154704	-86.9763	.127073	-155.669
1	2	.189894	-119.508	173041	-187.715	.154704	-268.978	.127073	-335.66B
1	•	.189394	-499.503	.1730+1	-7.71480	.154704	-86.9785	.127073	-155.669
2	4	.197340	-124.424	.1801+8	-184.265	.170760	-257.573	.142519	-316.582
2	5	4766000	-350.909	.447382	-51.3580	740205.	-121.167	.177626	-107.103
2	0	-200996	-134.855	.141700	-207.968	.882050E-U	1 -200-718	.900499E-01	126.667- 10
3	1	.120726	-300.903	.139806	-352.043	.150385	-58.4394	.137926	-112.993
3	æ	.465808	-171.658	.739840	-229.562	0491750	-298.095	.247378	-343.296
3	6	-114804	-346.103	0-36149E-0	1 -324.064	.144285	-52.3499	.402178E-01	11 -130.713
P3H	10	.120726	-300.903	.139868	-352.643	.150385	-58.4394	.137926	-112.993
УЗН	11	-274339	-78.4107	.337548	-123.050	.385396	-169.214	.375330	-243.720
R3H	14	.604942E-01	- 322-118	.65257UE-U	_	.663357E-0	1 -63.4227	.590662E-01	
PZH	13	148051	-334.240	.176024	-21.8545	194561	-39.6563	.183765	-146.296
V2H	14	148051	-154.240	-176024	-201.854	.194561	-269.656	.163765	-326.296
RZH	15	.148051	-334.240	.176024	-21.8543	.194561	-84.0563	.183765	-146.296
NIO	16	1.00000	-360.000	1.00000	-360.000	1.00000	-360.000	1.00000	-360,000
M3	17	.651542	-172.398	.137552	-234.029	.452064	-315.015	1118111	-359.126
M3H	18	.253423	-00.0514	168606.	-115,173	.350749	-160.389	.338057	-236.344
TOO	19	.521036	-312.422	+14575.	-11.7515	.542326	-88.7588	.430312	-147.214
P4	50	140907	-304.051	151101.	-354.309	.168791	-57.8775	.154441	-110.227
14	77	.304625	-120.982	.290421	-155.043	.312532	-208.000	.317560	-253.431
	22	.117615	-218.802	.164324	-279.487	.176032	-8.71574	.132225	-72.9285
9	23	.992721E-01	1-245.920	.875258E-U	1 -284.479	-777172E-0	1 -532.122	-706971E-0	_
9	24	.476333	-45.3025	.543018	-63.7506	+66465.	-1+3.722	.562251	-193.748
85	52	.8912375-01	•	.139583	-170.447	.155460	-272.791	.121931	-334.957
•	97	.113643	-194.020	.118042	-216.324	.135008	-457.556	.136440	-296.756
•	27	.432+35	-35.1102	.527394	-69.7358	.572714	-117.720	.489116	-154.640
9	28	.386697E-01	217.993	.188141	-321.128	.215850	-13.4636	.191456	-18.8919
	24	.132087	-150.115	.161067	-181-654	.190359	-228.260	.182512	-268.728
1	30	.275338	-331.079	.249620	-12.6637	.213376	-69.9742	.171089	-105.674
1	31	.332,03	-124.844	470404.	-151.022	.546949	-173.427	.410948	-199.223
	32	.145772	-121.402	.174118	-151.809	.192318	-200.611	.170575	-240.013
90	33	.387769	-302-184	.368092	755.737	.374643	-357.686	.378471	-25.8633
80	34	.403760	-192.984	.613508	-209.217	.711012	-251.424	.628463	-278.649
6	35	.157053	-90.0211	.174452	-120.544	.175249	-166.690	.143048	-199.765
61	36	.261899	-276.101	. 480527	-291.002	.356981	-327.581	.373617	-2.38348
89	27	.414346	-290.107	. 559931	-309.891	.644383	-350.729	.570993	-20.1283
10	38	151041.	-60.4157	.154740	-88.2657	.145250	-127.537	.122502	-150.287
V10	39	-280582	-208.423	194746.	-231.632	.407048	-276.811	.370999	-312.604
10	40	.701149	-6.44036	.853637	-28.9256	.944528	-71.1915	.862880	-103.494
11	41	.140150	-50.6306	.138459	-76.3555	130041	-112.163	.115124	-132.047
V11	+2	.305789	-197.667	.386520	-2525-152	.430194	-267.458	.387627	-302.569
_	43	.733126	-23.0360	.891312	-47.1765	.980026	-90.0255	.889009	-123.791
V3 3	3/13	7 0.00002	-224.690	5.48955	-230.919	3.26993	-239.656	1.79356	-230.303
1 1	1/63	7 1.5724+	-356.545	1.23717	-15.07.0	1.02872	-30.5390	.921314	-42.0756
					2120	056.730			

RUMBLE MODEL WITH VECGUITER FLAMEHOLDER AUGMENTOR AND PROXIMATE FLOW SPLITTER USING FLAMEHOLDER COMBUSTION MODEL COMBUSTION DATA

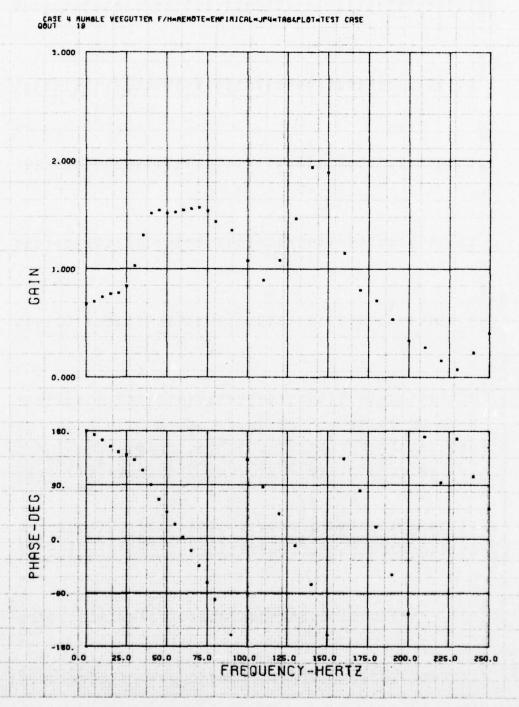
PARAMTER P1 V1 R1		N N N N N	EZ OC HEEL T				1	;	
222	ID NO.		PHASE ANGLE	NI P	PHASE ANGLE	GAIN	PHASE ANGLE	GAIN	PHASE ANGLE
72		.123764	-214-468	147225	-268.724	.185253	-335.515	207699	-44-1431
81	. ~	123704	-34.4070	147225	-86.7243	.185253	-155.515	207099	-224.143
	1 19	123704	-214.400	147275	-208.74	.185253	-335.515	207099	-44-1431
P.2	,	.139604	-7.8.790	165691	-24.2573	. 204895	-113.686	.224095	-174.392
٧2	2	0,0901.	-189.558	.199287	-206.084	. 350499	-250.848	.523860	-307.215
RZ	0	.124403	-353.497	.165825	-53.5457	.182964	-125.968	.141585	-188.367
P3	-	.139594	-160.988	.160913	-204.497	.182661	-254.367	.171520	-312.974
<b>V3</b>	20	.139924	-344.045	704607.	-336.404	160095.	-19.4363	.867800	-75.4040
R3	•	.881co4E-ul	1 -139.733	.102451	-202-321	.120068	-201.606	.111436	-293.369
РЗН	10	.139594	-160.988	.100915	-204.497	.182661	-259.307	.171520	-312.974
V3H	==	.403373	-291.619	+17564.	-335.026	. 295288	-30.4776	.593749	-85.2710
RSH	12	.601616E-C1	1 -151.418	H	-01 -187.040	-889298E-	-01 -256.317	-921604E-	-01 -285.254
Р2Н	13			179077	-242.255	.268725	-299.506	.261769	-355.651
V2H	+1	.19188+	-10.4070	.448617	-62.2552	.268725	-119.506	.261769	-175.651
RZH	15	.191664	-190.407	179977	-242,255	.260725	-299.506	.261769	-355.651
ZIJ	16	1.00000	-360.000	1.00000	-260,000	1.00000	-300.000	1.00000	-360.000
M3	11	.105264E-01		1195117	-299.071	.502456	-7.12181	.782966	-70.37%
W3H	18	.355008	-285.689	*****	-350,543	916916.	-26.7502	.508122	-81.7150
1000	15	.+15+52	-199.420	.413880	-247,480	21610+-	-296.829	.365192	-342.173
4.d	20	1199611	-120.040	.161008	-198,222	.211207	-251.110	.205220	-303.185
*	21	.304000	-295.910	414614.	-335,929	.028484	-29.0733	161069.	-82.877*
R4	22	.138241	-121.830	.164232	-180,529	.143215	-248.018	.111237	-301.436
P5	23	.815148E-0	_	.114725	-64.3263	.162099	-110.587	.189865	-159.366
45	24	.58085.	-236.255	.076002	-278.074	.777563	-329.104	.738614	-19.0119
RS	52	.138825	-27.4389	.131504	-79.6953	.134270	-107.580	.178786	-153.048
Po	50	.148706	-337.075	.188003	-17.3249	.240375	-70.9806	.259668	-123.636
No.	27	.420283	-165.905	.396950	-213.949	.373703	-253.011	.331450	-291.080
R6	28	.221233	-23.0262	119056.	155.2557	.451614	-75.1267	.303083	-105.528
14	53	114181.	-307.613	196707	-345.495	.227735	-30.6434	155717.	-80.1560
	30	.184635	-129.216	c71c72.	-150.028	.434952	-191.066	.556445	-435.565
R	31	.298958	-215.866	.208075	-214.297	.258928	-230.338	.241851	-227.458
Ba	34	.155526	-274.919	-157805	-305.911	.161495	1-246-747	.149672	-25.9300
9	23	155024.	-50.0712	116976.	-90.2671	289640.	-136.008	.075078	-186.321
K8	34	+65910.	-300-323	.020070	-517.124	.667982	-347.805	.634528	-11.0681
64	35	.126511	-224.176	.134207	-241.931	.174114	-273.115	.203160	-309.000
6	20	11+10+	-36.65/8	.492793	-64.3796	+59465.	-115.481	.603280	-160.663
80	37	.529985	-45.7650	177455	-67.6389	.546725	-101-252	.470343	-123.743
P10	20	.128890	-107.732	.173416	-107.050	.239989	-220.432	.275345	-208.399
410	60	.200066	-245.632	.387253	-16.7709	**0000**	-59.4141	. 250347	-95.6726
RIO	24	066020.	-135.646	. 207018	-154.350	+10814.	-197.815	.934223	743162-
111	1+1	1124517	-150.254	178957	-172.718	.240166	-213.822	109572.	-256.936
111	7+	.357860	-333.943	021576.	-1.47525	.382245	-34.4671	.354709	-71.1222
R11	+3	.8+4870	-153,381	.928494	-180.199	1.00958	-218.486	.484500	-252.749
	0/15	7 1.00635	-103.031	1.07+20	-131.900	3.10245	-120.570	5.05940	-122.430
14	1/2	7,00000	-23.4802	.914930	-04.6270	1.01419	-10.1484	1.21095	-41.164
_	1/23	7 .926600	-349.201	1.11201	-343.221	1.34768	-314.455	1.60798	-303.902

RUMBLE MOGEL MITH VEEGUTTER FLAMEMULDER AUGMENTUR AND PROXIMATE FLOW SPLITTER USING FLAMEMOLDER COMBUSTION MODEL COMBUSTION DATA

O CASE 1	NUMBEL		F/H#FKUXIMAIC#F/H	COMB. MODEL	TEST CASE							
		2	- 1. C. C. L. L. C. T.									
PARAMITE IN MIL	Its will	TAROUNCE	PHAN ANILL	FRECUENCY	1 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	ANGLE PR	FREUDENCY	D.0.0	ALKI Z	FREGUENCY	0.0	MER 12
-		21.00	יוני אויי					35411	MOLE		200	
	-	544017	-114-135	0.							?	
	7	.215+93	-294.159		2.	•	0	0.		0.	•	
	1	.210493	-114.757	0.	0.	•	0.	0.		9.	•	
	4	.245622	-230.096	0.	٠.	•	٥.	0.		0.	•	
		.662474	-10.0048	0.	0.		0.	0.		٥.	•	
	o	.121054	-423.514	0.	0.	•	0.	0.		0.	•	
	1	1101-1.	-2.60197	0.	0.		0	0.		•	0.	
	8	1.08700	-135.394	0.	2.		0	0.		0.	3.	
R3	,	.145024	-15.659+	0.	?		0	0.		0.	0.	
P3H	10	141011	-2.00197	,	0.		0	0.		0.	0.	
731	::	510.70	-133.161	9.	0		3			0.		
K3H	17	-471177	-61 -331-727	0.	0							
P2H	13	223050			2 3							
42H		223654	-227.352									
100		22.550	1646 74-		2							
		90000	1300011									
	17	00000	200.000									
		1.04113	116.021-			•						
MSH	Ic	.43(482	-137.101	0.	?	•	0.	2.		0.	3.	
	14	.334483	-13.48>>	0.	0.		0.	0.		0.	•	
44	50	.178929	-350.866	0.		•	0.	0.		0.	•	
44	71	.07+711	-135.425	0.	0.		0.	٥.		0.	0.	
R4	22	.co4319E-	-01 -24.4941	0.	0.	•	0.	0.		0.	0.	
P5	23	.194990	-208.082	.0.	0.	•	0	٥.		0.	0.	
45	57	.621794	-63.2692	0.	٥.		0.	0.		0.		
R5	25	.215526	-191.905	0.	0.		0.	0.		0.	0.	
94	56	.247469	-171.955	0.	0.	•	0.	0.		0.	•	
9,	27	.318222	-334.018	0.	0.	•	0.	0.		0.	?	
R6	26	.246601	-121.505	0.	0.	•	0.	0.		•	•	
77	53	.188759	-128.792	0.	0.		0.	0.		0.	0.	
	36	Tucclo.	-219.554	0.	0.	•	0.	0.		0.	0.	
17	31	.321775	-228.715	0.	0.	•	0.	0.		0.	0.	
	3.2	.145118	-53.9194	0.	0.	•	0.	0.		0.	0.	
	23	127619.	-231.678	0.	0.	•	0.	0.		0.	0.	
88	3+	.637165	-29.5705	0.	0.	•	0	0.		0.	0.	
50	35	.211677	-347.333	0.	0.	•	0.	0.		0.	0.	
64	00	.539184	-149.645	0.	,.	•	0.	0.		0.	0.	
89	37	.482129	-137.790	0.	0.	•	0.	•		0.	0.	
0	38	.273739	-308-594	0.	0.	•	0.	0.		0.	0.	
0	34	.363722	-144.899	0.	0.	•	0.	0.		0.	0.	
0	10	197999.	-260.321	0.	0.	•	0.	•		0.	0.	
1	7.	.205957	-297.067	0.	0.	•	0.	0.		0.	0.	
V11	74	.352510	-97.2063	0.	0.		0	0.		0.	0.	
R11	43	.959428	-284.012	0.	0.	•	0.	0.		0.	0.	
	54/0	7 7.70860	-133.590	0.	0.		0	0.		0.	0.	
	1/83		111.72	0-	0							
		1				•				2	0.	

MUMBLE MUDEL ALTH VILGUITER FLAMENLUER AUGMENTON AND PROXIMATE FLOW SPLITTER USING FLAMEHULDER COMBUSTION MUDEL COMBUSTION DATA

O CASE 1	O CASE I NUMBLE VEESUITER	VEEL	1	KUAIMATE *F/H	CUMB. MODEL	TEST CASE	A AN OTHER DESIGNATION OF THE PERSON OF THE		× 144	9	. 1	
PAKANTER IL	The oding		CALN	2		PHASE		PHASE	GAIN	PHASE	ANILE	
10			2351.04		0		0		0.	0		
			20000	-186 600			2 9		20	2 9		
			100000	5		2.3						
110	1		400000	0202001-01					•			
7	*		811187	283180E-01		•	•		•			
75			211187	-180.024	•	2.	0.	•	•	•		
RZ	0		.267716	72555E-01	0.	0.	•	0.	•	•		
P3	1		.287716	552525E-01	٥.	0.	0.	0.	0.	٥.		
V.	a		.287718	-177.961	0.	0.	0.	0.	0.	0.		
R.:	,		.287710	803577E-61	0.	٦.	0.	0.	0.			
РЗН	10		.2877116	5525256-01	0.	0.	0.	0.	9.	0.		
V3H	11		-287716	-180-050	0.	0.	0.	0.	0.	0.		
Ran	75		.287710	5744721-01		0.	0.	0.	0.	0.		
PZH	13		.287718	567294E-UI	6	0.	0.	0	0.	0		
V2H	14		.287710	-180.057		0	0	0.	0.	0.		
RZH	15		.267710	5072945-01	,	9.	0.	0.	0.	0.		
2 7	16		1.00000	-360-000	0.	, ,	0.	)	0.			
13	17		4	-03 -90-0673	0	0-	0.	0	0.	0		
77.7	3-											
Tingo	07		¥ .	20.0488		•		•	•			
1007	2		240065	101398E-01	?	?	?		•			
**	50		.300/41	5294205-01	٥.	0.	0.	0.	0.	•		
**	21		141006.	-180.036		0.	0.	0.	0.	•		
R4	55		.306741	708219E-01	0.	0.	0.	•	0.	2.		
PS	23		.306741	5113744-01	0.	0.	0.	0.	0.	0.		
45	54		.300741	-180.023	0.	0.	0.	0.	0.	0.		
85	23		.306741	793634E-01	0.	0.	0.	0.	0.	2.		
Pe	56		.300013	519819E-01	0.	0.	0.	0.	0.	0.		
94	27		.100045	-180.003	0.	0.	0.	0.	0.	0.		
86	28		100134	2 30507	0	0-	0.	0.	0.	0.		
67	200		201656	10-32826								
	30			10-15-076-01		•			•	2		
	2		U 0					•				
	15		.308618E-01	•		0.	0.	0.		2.		
84	32		159997	537347E-01	•	0.	0.	0.	•	0.		
88	33		.130042	-354.478		0.	0.		0.	0.		
RB	34		.131474	-179.855	0.	•	0.	0.	0.	0.		
64	35		.278579	547231E-01	0.	0.	0.	0.	0.	2.		
64	30		.208392	-359.997	0.	0.	0.	0.	0.	0.		
89	37		.209530	-179.926	0.	0.	0.	0.	0.	0.		
PIO	38		.269545	558485E-01	0.	0.	0.	0.	0.	0.		
710	3.4		.271190	6346534-02	0.	9.	0.	0.	0.	0.		
RIO	40		.474846	-174.957	0.	0.	0.	0.	0.	0.		
P11	14		.269542	529027E-01	0.	0.	9.	0.	0.	0.		
111	42		.271196	724004E-02	°	0.	0.	0.	0.	0.		
RII	4.5		.272846	-174.454	0.	0.	0.	0.	0.	0.		
	0/P3	1	1.00000	-179.926	0.	0.	0.	0.	0.	0.		
P1	1/93	1	*5608 B.	105840E-01	2.	0.		0.	0.	0		
_	+1/P3		.936837	-,630208E-03	0.	0.	0.	0.	0.	2.		



RUMBLE MUDEL WITH VEEGUTIER FLAMEHOLDER AUGMENTOR AND REMOTE FLOW SPLITTER USING EMPIRICAL COMBUSTION DATA

CASE 4 RUMBLE VEEGUTTER F/H\*REMOTE\*EMMENICAL\*JP4\*TADEPLOT\*TEST CASE

FAV =LUUDE-01 15 A DEFAULT MOCK =	*	MARNING	1	PANAMETER	bPK.	11	00064.	15	4	DEFAULT	VALUE
MARNING - PARAMETER JFUEL = 1.15000 15 A DEFAULT MARNING - PARAMETER MOC = .20000 15 A DEFAULT MARNING - PARAMETER MOC = .64C00E-01 15 A DEFAULT MARNING - PARAMETER LA = .64C00E-01 15 A DEFAULT MARNING - PARAMETER LA = .64C00E-01 15 A DEFAULT MARNING - PARAMETER LA = .64C00E-01 15 A DEFAULT MARNING - PARAMETER LC = .72.000 15 A DEFAULT MARNING - PARAMETER RC = .22000 15 A DEFAULT MARNING - PARAMETER RC = .22000 15 A DEFAULT MARNING - PARAMETER RC = .22000 15 A DEFAULT MARNING - PARAMETER RC = .22000 15 A DEFAULT MARNING - PARAMETER RC = .22000C-02 15 A DEFAULT MARNING - PARAMETER RC = .30000CU-02 15 A DEFAULT MARNING - PARAMETER RC = .30000CU-02 15 A DEFAULT MARNING - PARAMETER RC = .30000CU-02 15 A DEFAULT MARNING - PARAMETER RC = .30000CU-01 15 A DEFAULT MARNING - PARAMETER RC = .300	*	WARNING	•	PARAMETER	FAV	11	. < 1000E-01	15	<	DEFAULT	VALUE
MARNING - PARAMETER MOC = .1500U 15 A DEFAULT WARNING - PARAMETER MOH = .2600U 15 A DEFAULT WARNING - PARAMETER DPD = .6400UE-01 15 A DEFAULT WARNING - PARAMETER LC = .6400UE-01 15 A DEFAULT WARNING - PARAMETER LC = .6400U 15 A DEFAULT WARNING - PARAMETER LC = .6200U 15 A DEFAULT WARNING - PARAMETER LC = .6200U 15 A DEFAULT WARNING - PARAMETER MORN = .2200U 15 A DEFAULT WARNING - PARAMETER PRNUZ = .5000UE-02 15 A DEFAULT WARNING - PARAMETER PRNUZ = .5000UE-02 15 A DEFAULT WARNING - PARAMETER PRNUZ = .5000UE-02 15 A DEFAULT WARNING - PARAMETER PRN = .5000UE-02 15 A DEFAULT WARNING - PARAMETER FAH = .5000UE-02 15 A DEFAULT WARNING - PARAMETER FAH = .5000UE-02 15 A DEFAULT WARNING - PARAMETER LT = .5000UE-02 15 A DEFAULT WARNING - PARAMETER LT = .5000UE-02 15 A DEFAULT WARNING - PARAMETER LT = .5000UE-02 15 A DEFAULT WARNING - PARAMETER LT = .5000UE-02 15 A DEFAULT WARNING - PARAMETER LT = .5000UE-02 15 A DEFAULT WARNING - PARAMETER LT = .5000UE-02 15 A DEFAULT WARNING - PARAMETER LT = .5000UE-02 15 A DEFAULT WARNING - PARAMETER LE .5000UE-02 15 A DEFAULT WARNING - PARAMETER LE .5000UE-02 15 A DEFAULT WARNING - PARAMETER LE .5000UE-02 15 A DEFAULT WARNING - PARAMETER LEFT = .0000UE-02 15 A DEFAULT WARNING - PARAMETER LEFT = .0000UE-02 15 A DEFAULT WARNING - PARAMETER LEFT = .0000UE-02 15 A DEFAULT WARNING - PARAMETER LEFT = .0000UE-02 15 A DEFAULT WARNING - PARAMETER LEFT = .0000UE-02 15 A DEFAULT WARNING - PARAMETER LEFT = .0000UE-02 15 A DEFAULT WARNING - PARAMETER LEFT = .0000UE-02 15 A DEFAULT WARNING - PARAMETER LEFT = .0000UE-02 15 A DEFAULT WARNING - PARAMETER LEFT = .0000UE-02 15 A DEFAULT WARNING - PARAMETER LEFT = .0000UE-02 15 A DEFAULT WARNING - PARAMETER LEFT = .0000UE-02 15 A DEFAULT WARNING - PARAMETER LEFT = .0000UE-02 15 A DEFAULT WARNING - PARAMETER LEFT = .0000UE-02 15 A DEFAULT WARNING - PARAMETER LEFT = .0000UE-02 15 A DEFAULT WARNING - PARAMETER LEFT = .0000UE-02 15 A DEFAULT WARNING - PARAMETER LEFT = .0000UE-02 15 A DEFAULT WARNING - PARAMETER LEFT = .0000UE-02 15 A DEFAULT WARNING - PARAME	:	MAKNING		PAKAMETEK	JFUEL	"	-	15	4	DEFAULT	VALUE
MARNING - PARAMETER MOH = .26000 IS A DEFAULT MARNING - PARAMETER DPD = .64000E-01 IS A DEFAULT MARNING - PARAMETER LC	*	MARNING		PAKAMETER	MOC	"	.15000	15	•	DEFAULT	VALUE
MARNING - PARAMETER DPD = .64CUUE-U1 15 A DEFAULT WARNING - PARAMETER LA = .0 15 A DEFAULT WARNING - PARAMETER LA = .0 15 A DEFAULT WARNING - PARAMETER LA = .0 14.000 15 A DEFAULT WARNING - PARAMETER LE = .0000 15 A DEFAULT WARNING - PARAMETER RE LE = .0000 15 A DEFAULT WARNING - PARAMETER RULL = .0000 15 A DEFAULT WARNING - PARAMETER RULL = .00000-02 15 A DEFAULT WARNING - PARAMETER RULL = .00000-02 15 A DEFAULT WARNING - PARAMETER FAC = .00000-02 15 A DEFAULT WARNING - PARAMETER FAC = .00000-02 15 A DEFAULT WARNING - PARAMETER FAC = .00000-01 15 A DEFAULT WARNING - PARAMETER FAC = .00000-01 15 A DEFAULT WARNING - PARAMETER FAC = .00000-01 15 A DEFAULT WARNING - PARAMETER LD = .00000-01 15 A DEFAULT WARNING - PARAMETER LD = .00000-01 15 A DEFAULT WARNING - PARAMETER LS  = .00000-01 15 A DEFAULT WARNING - PARA	:	MARNING	1	PAKAMETER	Mon	"	00002.	15	1	DEFAULT	VALUE
MARNING - PARAMETER DPS = .0 15 A DEFAULT WARNING - PARAMETER LA	***	MAKNING		PAKAMETER	DPD	"	.64COUE-01	15	•	LEFAULT	VALUE
MARNING - PARAMETER LA = 82.000 15 A DEFAULT MARNING - PARAMETER LC = 72.000 15 A DEFAULT MARNING - PARAMETER LC = 30.000 15 A DEFAULT MARNING - PARAMETER LH = 14.000 15 A DEFAULT MARNING - PARAMETER REPROSE = .22000 15 A DEFAULT MARNING - PARAMETER REPROSE = .50000E-02 15 A DEFAULT MARNING - PARAMETER REPROSE = .50000E-02 15 A DEFAULT MARNING - PARAMETER ETAM = .91000 15 A DEFAULT MARNING - PARAMETER ETAM = .91000 15 A DEFAULT MARNING - PARAMETER FAC = .90000E-02 15 A DEFAULT MARNING - PARAMETER LD = .90000E-02 15 A DEFAULT MARNING - PARAMETER LD = .90000E-02 15 A DEFAULT MARNING - PARAMETER LD = .90000E-02 15 A DEFAULT MARNING - PARAMETER LD = .90000E-02 15 A DEFAULT MARNING - PARAMETER LD = .90000E-02 15 A DEFAULT MARNING - PARAMETER LD = .90000E-02 15 A DEFAULT MARNING - PARAMETER LC = .90000 15 A DEFAULT MARNING - PARAMETER ZEFH = .900000 15 A DEFAULT MARNING - PARAMETER ZEFH = .90000 15 A DEFAULT MA	:	MAKNING	1	PANAMETER	OPS	"	0.	15	•	DEFAULT	VALUE
MARNING - PARAMETER LC = 72.000 IS A DEFAULT MARNING - PARAMETER LH = 14.000 IS A DEFAULT MARNING - PARAMETER RCR = .22000 IS A DEFAULT MARNING - PARAMETER RCR = .22000 IS A DEFAULT MARNING - PARAMETER RCR = .3000UE-02 IS A DEFAULT MARNING - PARAMETER RCR = .3000UE-02 IS A DEFAULT MARNING - PARAMETER RTAC = .3000UE-02 IS A DEFAULT MARNING - PARAMETER RTAC = .3000UE-02 IS A DEFAULT MARNING - PARAMETER RTAC = .3000UE-02 IS A DEFAULT MARNING - PARAMETER RTAC = .3000UE-02 IS A DEFAULT MARNING - PARAMETER RTAC = .3000UE-03 IS A DEFAULT MARNING - PARAMETER RCR = .4000UE-03 IS A DEFAULT MARNING - PARAMETER LC = .4000UE IS A DEFAULT MARNING - PARAMETER LC = .4000UE IS A DEFAULT MARNING - PARAMETER RCR = .4000UE IS A DEFAULT MARNING - PARAMETER RCR = .4000UE IS A DEFAULT MARNING - PARAMETER RCR = .4000UE IS A DEFAULT MARNING - PARAMETER RCR = .4000UE IS A DEFAULT MARNING - PARAMETER RCR = .00 IS A DEFAULT MARNING - PARAMETE	***	MARNING		PAKAMETER	4	"	82.000	15	•	DEFAULT	VALUE
MARNING - PARAMETER LH = 14.000 15 A DEFAULT MARNING - PARAMETER RLZ = 50.00C 15 A DEFAULT MARNING - PARAMETER RLZ = .2000 15 A DEFAULT MARNING - PARAMETER RULZ = .4.000 15 A DEFAULT MARNING - PARAMETER RUGGE = .500000-02 15 A DEFAULT MARNING - PARAMETER RUGGE = .500000-02 15 A DEFAULT MARNING - PARAMETER RAC = .40000 15 A DEFAULT MARNING - PARAMETER FAC = .40000 15 A DEFAULT MARNING - PARAMETER FAC = .40000 15 A DEFAULT MARNING - PARAMETER RULD = .500000-01 15 A DEFAULT MARNING - PARAMETER RULD = .400000 15 A DEFAULT MARNING - PARAMETER RULD = .400000 15 A DEFAULT MARNING - PARAMETER RULD = .40000 15 A DEFAULT MARNING - PARAMET	:	MARNING	1	PAKAMETER	27	*	74.000	12	4	DEFAULT	VALUE
MAKNING - PARAMETER L2 = 30.00C 15 A DEFAULT MAKNING - PARAMETER MENTR = .22000 15 A DEFAULT MAKNING - PARAMETER PKNUZ =+.+000 15 A DEFAULT MAKNING - PARAMETER TRUZ =+0000 15 A DEFAULT MAKNING - PARAMETER MAUGOF =52000E-01 15 A DEFAULT MAKNING - PARAMETER ETAL =+0000 15 A DEFAULT MAKNING - PARAMETER ETAL =+0000 15 A DEFAULT MAKNING - PARAMETER FAT =+0000 15 A DEFAULT MAKNING - PARAMETER FAT =+0000 15 A DEFAULT MAKNING - PARAMETER L1 =+0000 15 A DEFAULT MAKNING - PARAMETER L1 =+0000 15 A DEFAULT MAKNING - PARAMETER L1 =+0000 15 A DEFAULT MAKNING - PARAMETER L5 =+0000 15 A DEFAULT MAKNING - PARAMETER LEFC =+0000 15 A DEFAULT MAK	:	WARNING	1	PAKAMETER	н	**	14.000	15	4	DEFAULT	VALUE
MARNING - PARAMETER MCR = .22000 15 A DEFAULT MARNING - PARAMETER NEWITK = . MARNING - PARAMETER TCORE = .50000E-02 15 A DEFAULT MARNING - PARAMETER NAUGOF = 1 MARNING - PARAMETER ETAL = .50000E-02 15 A DEFAULT MARNING - PARAMETER ETAL = .91000 15 A DEFAULT MARNING - PARAMETER FAC = .95000E-01 15 A DEFAULT MARNING - PARAMETER FAC = .59500E-01 15 A DEFAULT MARNING - PARAMETER LD = .90000 15 A DEFAULT MARNING - PARAMETER LD = .90000 15 A DEFAULT MARNING - PARAMETER LD = .90000 15 A DEFAULT MARNING - PARAMETER LD = .90000 15 A DEFAULT MARNING - PARAMETER LC = .90000 15 A DEFAULT MARNING - PARAMETER TCC = .900000 15 A DEFAULT MARNING - PARAMETER TCC = .90000 15 A DEFAULT MARNING - PARAMETER TCC = .90000 15 A DEFAULT MARNING - PARAMETER TCC = .90000 15 A DEFAULT MARNING - PARAMETER TCC = .90000 15 A DEFAULT MARNING - PARAMETER TCC = .90000 15 A DEFAULT MARNING - PARAMETER TCC = .90000 15 A DEFAULT MARNING - PARAMETER TCC = .90000 15 A DEFAULT MARNING - PARAMETER TCC = .90000 15 A DEFAULT MARNING - PARAMETER TCC = .90000 15 A DEFAULT MARNING - PARAMETER TCC = .90000 15 A DEFAULT MARNING - PARAMETER TCC = .90000 15	*	WARNING	•	PAKAMETER	77	"	30.000	57	4	DEFAULT	VALUE
MARNING - PARAMETER NFRUT = 0.  WARNING - PARAMETER PRNUZ = 1.0000 is A DEFAULT MARNING - PARAMETER NAUGH = .50000L-02 is A DEFAULT NARNING - PARAMETER PAR  = .52000C-01 is A DEFAULT NARNING - PARAMETER ETAC = .52000C-01 is A DEFAULT NARNING - PARAMETER FAC = .59500C-01 is A DEFAULT NARNING - PARAMETER FAC = .59500C-01 is A DEFAULT NARNING - PARAMETER LD = .40000 is A DEFAULT NARNING - PARAMETER LD = .40000 is A DEFAULT NARNING - PARAMETER LD = .40000 is A DEFAULT NARNING - PARAMETER LS = .40000 is A DEFAULT NARNING - PARAMETER LS = .40000 is A DEFAULT NARNING - PARAMETER LS = .40000 is A DEFAULT NARNING - PARAMETER LS = .40000 is A DEFAULT NARNING - PARAMETER LS = .40000 is A DEFAULT NARNING - PARAMETER LS = .40000 is A DEFAULT NARNING - PARAMETER ZEFT = .40000 is A DEFAULT NARNING - PARAMETER ZEFT = .00 is A DEFAULT NARNING - PARAMETER ZEPT = .	**	MAKNING	1	PARAME TER	HCK	"	. 22000	15	•	DEFAULT	VALUE
MARNING - PARAMETER PRNUZ = ****000 15 A DEFAULT WARNING - PARAMETER TUORE = *50000E-02 15 A DEFAULT WARNING - PARAMETER PPH = *52000E-01 15 A DEFAULT WARNING - PARAMETER ETA = ***0000 15 A DEFAULT WARNING - PARAMETER FAC = ***0000 15 A DEFAULT WARNING - PARAMETER FAC = ***59000E-01 15 A DEFAULT WARNING - PARAMETER FAC = ***59000E-01 15 A DEFAULT WARNING - PARAMETER LD = ***59000E-01 15 A DEFAULT WARNING - PARAMETER LD = ***59000C 15 A DEFAULT WARNING - PARAMETER LS = ****5900C 15 A DEFAULT WARNING - PARAMETER LS = ****5900C 15 A DEFAULT WARNING - PARAMETER LS = ****5900C 15 A DEFAULT WARNING - PARAMETER LS = **********************************	:	MARNING	1	PARAMETER	NPKNIK	=	0	15	4	DEFAULT	VALUE
MARNING - PARAMETER TCORE = .500000E-02 15 A DEFAULT WARNING - PARAMETER NAUGOF =52000E-01 15 A DEFAULT WARNING - PARAMETER ETAC = .40000 15 A DEFAULT WARNING - PARAMETER FAC = .52000E-01 15 A DEFAULT WARNING - PARAMETER FAC = .52000E-01 15 A DEFAULT WARNING - PARAMETER FAC = .59000E-01 15 A DEFAULT WARNING - PARAMETER LD = .50000E-01 15 A DEFAULT WARNING - PARAMETER LD = .50000E-01 15 A DEFAULT WARNING - PARAMETER LS = .50000 15 A DEFAULT WARNING - PARAMETER LS = .50000 15 A DEFAULT WARNING - PARAMETER LS = .50000 15 A DEFAULT WARNING - PARAMETER LS = .50000 15 A DEFAULT WARNING - PARAMETER LS = .50000 15 A DEFAULT WARNING - PARAMETER LEH = .40000 15 A DEFAULT WARNING - PARAMETER LEH = .40000 15 A DEFAULT WARNING - PARAMETER LEH = .0 15 A DEFAULT WARNING - PARAMETER LEH	**	WAKNING	1	PAKAMETER	PRNUZ	11	0004.4	5	4	DEFAULT	VALUE
MARNING - PARAMETER NAUGUF = 1.32UUGE-01 IS A DEFAULT NARNING - PARAMETER ETA = .4000U IS A DEFAULT NARNING - PARAMETER ETA = .4000U IS A DEFAULT NARNING - PARAMETER FAC = .5920UCE-01 IS A DEFAULT NARNING - PARAMETER FAC = .5920UCE-01 IS A DEFAULT NARNING - PARAMETER LD = .400UC IS A DEFAULT NARNING - PARAMETER LD = .400UC IS A DEFAULT NARNING - PARAMETER LC = .400UC IS A DEFAULT NARNING - PARAMETER LC = .400UC IS A DEFAULT NARNING - PARAMETER TOC = .400UC IS A DEFAULT NARNING - PARAMETER TOC = .400UC IS A DEFAULT NARNING - PARAMETER ZEFH = .400UC IS A DEFAULT NARNING - PARAMETER ZEFH = .400UC IS A DEFAULT NARNING - PARAMETER ZEFH = .400UC IS A DEFAULT NARNING - PARAMETER ZEFH = .400UC IS A DEFAULT NARNING - PARAMETER ZEFH = .400UC IS A DEFAULT NARNING - PARAMETER ZEFH = .00 IS A DEFAULT NARNING - PARAM	***	MARNING	1	PAKAMETER	TCORE	11	. 50000ve-02	57	4	DEFAULT	VALUE
MARNING - PAKAMETER DPH = .32000E-01 1S A DEFAULT MARNING - PAKAMETER ETAC = .40000 1S A DEFAULT MARNING - PAKAMETER FAC = .59500E-01 1S A DEFAULT MARNING - PAKAMETER FAC = .4000UE-01 1S A DEFAULT MARNING - PAKAMETER LD = .4000UE-01 1S A DEFAULT MARNING - PAKAMETER LD = .000U 1S A DEFAULT MARNING - PAKAMETER LS = .4000U 1S A DEFAULT MARNING - PAKAMETER LS = .400UC 1S A DEFAULT MARNING - PAKAMETER LS = .400UC 1S A DEFAULT MARNING - PAKAMETER ZEF = .400UC 1S A DEFAULT MARNING - PAKAMETER ZEF = .400UC 1S A DEFAULT MARNING - PAKAMETER ZEF = .400UC 1S A DEFAULT MARNING - PAKAMETER ZEF = .400UC 1S A DEFAULT MARNING - PAKAMETER ZEF = .0 1S A DEFAULT MARNING - PAKAMETER ZEF = .0 1S A DEFAULT MARNING - PAKAMETER ZEF = .0 1S A DEFAULT MARNING - PAKAMETER ZEF = .0 1S A DEFAULT MARNING - PAKAMETER ZEF = .0 1S A DEFAULT MARNING - PAKAMETER ZEF = .0 1S A DEFAULT MARNING - PAKAMETER ZEF = .0 1S A DEFAULT MARNING - PAKAMETER ZEF = .0 1S A DEFAULT MARNING - PAKAMETER ZEF = .0 1S A DEFAULT MARNING - PAKAMETER ZEF = .0 1S A DEFAULT MARNING - PAKAMETER ZEF = .0 1S A DEFAULT MARNING - PAKAMETER ZEF = .0 1S A DEFAULT MARNING - PAKAMETER ZEF = .0 1S A DEFAULT MARNING - PAKAMETER ZEF = .0 1S A DEFAULT	***	WAKNING	1	PARAMETER	MAUGUE	11	1	15	4	DEFAULT	VALUE
MARNING - PARAMETER ETAC =0000 15 A DEFAULT WARNING - PARAMETER ETAH =01000 15 A DEFAULT WARNING - PARAMETER FAL =00000-01 15 A DEFAULT WARNING - PARAMETER LD = .00000-01 15 A DEFAULT WARNING - PARAMETER LD = .00000 15 A DEFAULT WARNING - PARAMETER LD = .00000 15 A DEFAULT WARNING - PARAMETER LS =0000 15 A DEFAULT WARNING - PARAMETER LS =0000 15 A DEFAULT WARNING - PARAMETER LEFT =0000 15 A DEFAULT	*	WAKNING		PAKAMETER	ОРН	11	.32000E-01	15	•	DEFAULT	VALUE
MARNING - PAKAMETEK ETAH = .9100U 15 A DEFAULT MARNING - PAKAMETER FAC = .59200C-01 15 A DEFAULT MARNING - PAKAMETER FAH = .4000UC-0.1 15 A DEFAULT MARNING - PAKAMETER L1 = 66.00C 15 A DEFAULT MARNING - PAKAMETER L1 = 5.00CC 15 A DEFAULT MARNING - PAKAMETER L1 = 5.00CC 15 A DEFAULT MARNING - PAKAMETER LSC = 4.00UC 15 A DEFAULT MARNING - PAKAMETER LSC = 700.00 15 A DEFAULT MARNING - PAKAMETER LEFC = .5.50CU 15 A DEFAULT MARNING - PAKAMETER LEFT = .40UCC 15 A DEFAULT MARNING - PAKAMETER LEFT = .40UCC 15 A DEFAULT MARNING - PAKAMETER LEFT = .0 15 A DEFAULT MARNING - PAKAMETER LEFT = .0 15 A DEFAULT MARNING - PAKAMETER LETT = .0 15 A DEFAULT MARNING - PAKAMETER LETT = .0 15 A DEFAULT MARNING - PAKAMETER LETT = .0 15 A DEFAULT WARNING - PAKAMETER LETT = .0 15 A DEFAULT WARNING - PAKAMETER LETT = .0 15 A DEFAULT WARNING - PAKAMETER LETT = .0 15 A DEFAULT WARNING - PAKAMETER LETT = .0 15 A DEFAULT WARNING - PAKAMETER LETT = .0 15 A DEFAULT	*	MARNING	1	PAKAMETER	ETAC	"	00000	15	4	DEFAULT	VALUE
WARNING - PARAMETER FAC = .55900E-01 IS A DEFAULT WARNING - PARAMETER FAH = .40000E-01 IS A DEFAULT WARNING - PARAMETER LD = 66-000 IS A DEFAULT WARNING - PARAMETER LL = 5.0000 IS A DEFAULT WARNING - PARAMETER LR = 60.000 IS A DEFAULT WARNING - PARAMETER LS = 4.0000 IS A DEFAULT WARNING - PARAMETER TOL = 700.00 IS A DEFAULT WARNING - PARAMETER ZEFL = .40000 IS A DEFAULT WARNING - PARAMETER ZEFL = .40000 IS A DEFAULT WARNING - PARAMETER ZEFL = .40000 IS A DEFAULT WARNING - PARAMETER ZEFL = .00 IS A DEFAULT WARNING - PARAMETER ZEPH = .00 IS A DEFAULT WARNING - PARAMETER ZEPH = .00 IS A DEFAULT WARNING - PARAMETER ZEPH = .00 IS A DEFAULT WARNING - PARAMETER ZEPH = .00 IS A DEFAULT WARNING - PARAMETER ZEPH = .00 IS A DEFAULT WARNING - PARAMETER ZEPH = .00 IS A DEFAULT WARNING - PARAMETER ZEPH = .00 IS A DEFAULT WARNING - PARAMETER ZEPH = .00 IS A DEFAULT	:	WAKNING	1	PAKAMETER	ETAH	**	.91000	12	4	DEFAULT	VALUE
MARNING - PARAMETER FAH = .4000UE-01 1S A DEFAULT WARNING - PARAMETER LD = .600UU 1S A DEFAULT WARNING - PARAMETER LL = .000U 1S A DEFAULT WARNING - PARAMETER LS = .000U 1S A DEFAULT WARNING - PARAMETER LS = .000U 1S A DEFAULT WARNING - PARAMETER LS = .000U 1S A DEFAULT WARNING - PARAMETER LE = .400UU 1S A DEFAULT WARNING - PARAMETER ZEF = .400UU 1S A DEFAULT WARNING - PARAMETER ZEP = .0 1S A DEFAULT WARNING - PARAMETER ZEP = .0 1S A DEFAULT WARNING - PARAMETER ZEP = .0 1S A DEFAULT WARNING - PARAMETER ZEP = .0 1S A DEFAULT WARNING - PARAMETER ZEP = .0 1S A DEFAULT WARNING - PARAMETER ZEP = .0 1S A DEFAULT WARNING - PARAMETER ZEP = .0 1S A DEFAULT WARNING - PARAMETER ZEP = .0 1S A DEFAULT WARNING - PARAMETER ZEP = .0 1S A DEFAULT WARNING - PARAMETER ZEP = .0 1S A DEFAULT WARNING - PARAMETER ZEP = .0 1S A DEFAULT	**	MAKNING	1	PARAMETER	FAC	11	.59500E-01	15	4	DEFAULT	VALUE
WARNING - PARAMETER LD = 66.000 IS A DEFAULT WARNING - PARAMETER LI = 5.0000 IS A DEFAULT WARNING - PARAMETER LSC = 4.0000 IS A DEFAULT WARNING - PARAMETER LSC = 4.0000 IS A DEFAULT WARNING - PARAMETER LEFC = 700.00 IS A DEFAULT WARNING - PARAMETER LEFC = 7.5.000 IS A DEFAULT WARNING - PARAMETER LEFC = .0 IS A DEFAULT WARNING - PARAMETER LEFC = .0 IS A DEFAULT WARNING - PARAMETER LEFC = .0 IS A DEFAULT WARNING - PARAMETER LEFC = .0 IS A DEFAULT WARNING - PARAMETER LEFC = .0 IS A DEFAULT WARNING - PARAMETER LEFC = .0 IS A DEFAULT WARNING - PARAMETER LEFC = .0 IS A DEFAULT WARNING - PARAMETER LEFC = .0 IS A DEFAULT WARNING - PARAMETER LEFC = .0 IS A DEFAULT WARNING - PARAMETER LEFC = .0 IS A DEFAULT	***	MAKNING	ı	PAKAMETER	FAH	"	.40000E-01	15	•	DEFAULT	VALUE
WARNING - PARAMETER LI = 5.00CU IS A DEFAULT WARNING - PARAMETER LK = 60.00CU IS A DEFAULT WARNING - PARAMETER LSC = 4.00CU IS A DEFAULT WARNING - PARAMETER LSC = 700.0C IS A DEFAULT WARNING - PARAMETER LEFC = -5.50CU IS A DEFAULT WARNING - PARAMETER LEFC = -0.0CC IS A DEFAULT WARNING - PARAMETER LEFC = .0 IS A DEFAULT WARNING - PARAMETER LEFC = .0 IS A DEFAULT WARNING - PARAMETER LEFC = .0 IS A DEFAULT WARNING - PARAMETER LETC = .0 IS A DEFAULT WARNING - PARAMETER LETC = .0 IS A DEFAULT WARNING - PARAMETER LETC = .0 IS A DEFAULT WARNING - PARAMETER LETC = .0 IS A DEFAULT WARNING - PARAMETER LETC = .0 IS A DEFAULT WARNING - PARAMETER LETC = .0 IS A DEFAULT	:	WARNING	1	PAKAMETER	ده	"	66.000	15	4	DEFAULT	VALUE
MARNING - PARAMETER LK = 60.000 15 A DEFAULT MARNING - PARAMETER LSC = 4.0000 15 A DEFAULT MARNING - PARAMETER TOL = 700.00 15 A DEFAULT MARNING - PARAMETER ZEFL = -5.5000 15 A DEFAULT MARNING - PARAMETER ZEFL = -4.0000 15 A DEFAULT MARNING - PARAMETER ZEFH = -4.0000 15 A DEFAULT MARNING - PARAMETER ZEPH = -0 15 A DEFAULT MARNING - PARAMETER ZEPH = 0 15 A DEFAULT MARNING - PARAMETER ZEPH = 0 15 A DEFAULT MARNING - PARAMETER ZEPH = 0 15 A DEFAULT MARNING - PARAMETER ZEVH = 0 15 A DEFAULT MARNING - PARAMETER ZEVH = 0 15 A DEFAULT	:	WAKNING	1	PARAMETER	-	**	2.0000	15	4	DEFAULT	VALUE
MARNING - PARAMETER LSC = 4.0000 15 A DEFAULT WARNING - PARAMETER LSH = 8.0000 15 A DEFAULT WARNING - PARAMETER LEC = -5.5000 15 A DEFAULT WARNING - PARAMETER LEFC = -5.5000 15 A DEFAULT WARNING - PARAMETER LEFC = .0 15 A DEFAULT WARNING - PARAMETER LEPC = .0 15 A DEFAULT WARNING - PARAMETER LETC = .0 15 A DEFAULT WARNING - PARAMETER LETC = .0 15 A DEFAULT WARNING - PARAMETER LETC = .0 15 A DEFAULT WARNING - PARAMETER LETC = .0 15 A DEFAULT WARNING - PARAMETER LETC = .0 15 A DEFAULT WARNING - PARAMETER LETC = .0 15 A DEFAULT WARNING - PARAMETER LETC = .0 15 A DEFAULT WARNING - PARAMETER LETC = .0 15 A DEFAULT	:	WAKNING	1	PANAMETER	LK	"	60.000	15	4	DEFAULT	VALUE
MARNING - PARAMETER LSH = 8.6000 15 A DEFAULT WARNING - PARAMETER TOC. = 700.00 15 A DEFAULT WARNING - PARAMETER ZEFC = -5.5000 15 A DEFAULT WARNING - PARAMETER ZEPC = .0 15 A DEFAULT WARNING - PARAMETER ZEPC = .0 15 A DEFAULT WARNING - PARAMETER ZEPC = .0 15 A DEFAULT WARNING - PARAMETER ZEVC = .0 15 A DEFAULT WARNING - PARAMETER ZEVC = .0 15 A DEFAULT WARNING - PARAMETER ZEVC = .0 15 A DEFAULT WARNING - PARAMETER ZEVC = .0 15 A DEFAULT WARNING - PARAMETER ZEVC = .0 15 A DEFAULT	***	MAKNING	1	PAKAMETER	LSC	"	4.0000	57	4	DEFAULT	VALUE
MARNING - PARAMETER TOC. = 700.00 1S A DEFAULT MARNING - PARAMETER ZEFC = -5.5000 1S A DEFAULT MARNING - PARAMETER ZEFC = .0 1S A DEFAULT MARNING - PARAMETER ZEPH = .0 1S A DEFAULT MARNING - PARAMETER ZEPH = .0 1S A DEFAULT MARNING - PARAMETER ZETC = .0 1S A DEFAULT MARNING - PARAMETER ZEVC = .0 1S A DEFAULT WARNING - PARAMETER ZEVH = .0 1S A DEFAULT WARNING - PARAMETER ZEVH = .0 1S A DEFAULT	***	WARNING	1	PANAME TER	LSH	"	30000-8	15	•	DEFAULT	VALUE
MARNING - PARAMETER ZEFC = -5.5000 1S A DEFAULT MARNING - PARAMETER ZEFH = .40000 1S A DEFAULT MARNING - PARAMETER ZEPH = .0 1S A DEFAULT MARNING - PARAMETER ZEPH = .0 1S A DEFAULT MARNING - PARAMETER ZETC = .0 1S A DEFAULT MARNING - PARAMETER ZETC = .0 1S A DEFAULT WARNING - PARAMETER ZEVH = .0 1S A DEFAULT WARNING - PARAMETER ZEVH = .0 1S A DEFAULT	*	WARNING	1	PARAMETER	Toc	н	200.00	15	4	DEFAULT	VALUE
MARNING - PARAMETER ZEFH = .46000 IS A DEFAULT MARNING - PARAMETER ZEPC = .0 IS A DEFAULT MARNING - PARAMETER ZEPH = .0 IS A DEFAULT MARNING - PARAMETER ZETC = .0 IS A DEFAULT WARNING - PARAMETER ZEVC = .0 IS A DEFAULT WARNING - PARAMETER ZEVC = .0 IS A DEFAULT	:	MARNING	1	PAKAMETER	ZEFC	11	-5.5000	15	4	DEFAULT	VALUE
WARNING - PAKAMETER ZEPC = .0 IS A DEFAULT WARNING - PAKAMETER ZEPH = .0 IS A DEFAULT WARNING - PAKAMETER ZETC = .0 IS A DEFAULT WARNING - PAKAMETER ZEVC = .0 IS A DEFAULT WARNING - PAKAMETER ZEVC = .0 IS A DEFAULT WARNING - PAKAMETER ZEVH = .0 IS A DEFAULT	**	MARNING	1	PARAMETER	2EFH	#	270004.	15	4	DEFAULT	VALUE
MARNING - PAKAMETER ZEPH = .u IS A DEFAULT MARNING - PAKAMETER ZETC = .c IS A DEFAULT MARNING - PAKAMETER ZETH = .0 IS A DEFAULT WARNING - PAKAMETER ZEVH = .0 IS A DEFAULT	*	WAKNING	í	PARAMETER	ZEPC	11	0.	13	4	DEFAULT	VALUE
MANNING - PARAMETER ZETC = .6 IS A DEFAULT MANNING - PARAMETER ZETH = .0 IS A DEFAULT WARNING - PARAMETER ZEVH = .0 IS A DEFAULT WARNING - PARAMETER ZEVH = .0	**	MARNING	1	PAKAMETER	ZEPH	#		15	4	DEFAULT	VALUE
WARNING - PAKAMETER LETH = .0 IS A DEFAULT WARNING - PAKAMETER ZEVC = .0 IS A DEFAULT WARNING - PAKAMETER ZEVH = .0 IS A DEFAULT	**	MARNING	1	PAKAMETEK	ZETC .	11	9.	15	<	DEFAULT	VALUE
WARNING - PAKAMETER ZEVC = .0 IS A DEFAULT WARNING - PAKAMETER ZEVH = .0 IS A DEFAULT	*	MARNING	1	PAKAMETEK	LETH .	"		15	4	DEFAULT	VALUE
MARNING - PARAMETER ZEVH = .0 IS A DEFAULT	***	WARNING	1	PANAMETER	ZEVC	it	0.	13	•	DEFAULT	VALUE
	*	WARNING	1	PARAMETER	ZEVH	*	0.	15	4	DEFAULT	VALUE

		, 26 FH=
A 0.	• •	,ZEFC= -5.50000000 ,ZEVC= .0
17.64.64.64.44.44.44.44.44.44.44.44.44.44.	•••	,ZEFC= -5, ,ZEVC=
. 0 . PRNUZ		•
926666	•••	, ZETH=
12. 2. 2. 2. 2. 2. 2. 2. 2. 2. 2. 2. 2. 2	•••	•••
		, ZETC=
7,	•••	•
1.NCMMP= 1.N	•••	.0 ,2£PH=
10201344064971	• •	•
40	•••	, ZEPC=
222000024 7.22000024 7.22000024 7.2000024 7.2000024 7.2000024 7.2000024 7.2000024 7.2000024 7.2000024 7.2000024 7.2000024	•••	.0 .35999976 ZEVH= .u

THIS PROGRAM CHECKS SPLCIFIC INPUTS TO ENSURE KEASONABLE INPUT DATA.

IF THESE CHECKS ARE NOT SATISFIED THE JOB WILL BE TERMINATED.

VIOLATIONS, IF ANY, WILL BE PRINTED BELOW—

10	v)					
	00.	E-01,0PH=	2	.0	AC= .399999976	, LTAH= .91000
486208747	5153099945-40:	021585500E-408	.804804101E+57.	.745088501£+29.	1.05094910	.840413008E-71
.7370577695-77.	249535448E+21,	347439200£+22,	48620685	022420775E-40,	04717888.0	.695573415E+29,
.1540196092407.		444529115E+12,	347085097E+22,	267982192E#21,	125956224E+22,	443025877E+13,
-,347160282L+L.	.020139440E+57,	. 52440752.	.675573415E+29,	.154019809E+67,	.015101009E-18,	360565860E+13,
3470787922+22,	2584646491+21.	.804777103E+57,	252490752.	.080691094E+66,	.035363868E+70,	.0201394466+57,
. 343049139E401,	- 304602E451	140/033435-19,	1482148156427	- 407242774	- 1297203716+20	0003776.000
.025413887E+28.	.0044449456	145751131E+14.	.447985030E+24,	.345660067E+67,	.682648493£+67,	.101964911E+08,
-497497531±+29.	2+99091+56+29.	-511657301E+30.	118274944	.254087761E+58.	.175635962E+58,	.9718416255+37
.7482596841+19,	252493050.	.511069391E+33,	116275328.	.2540937472458,	.1756+1948E+58,	.971901488£+57,
.7432774702+19,	109 386 39 ct-08,	.396461950c+29,	.447981441E+24,	.497499009E+29,	.346920015E+29,	.0255121136+28,
.004445567t-50,	242270515c+15.	391200678E+22,	118279610.	.101567525E+29,	.236512668E+19,	.812401087E+19,
.147925390L-46,	4 .	138749431E+21,	184644939E+22,	.249909145E+29,	.220765722E+29,	.428835701E-47,
3996619606414	11 1669 full E+221	- 144444444 = HA-	348550014528BE	242497344	4684619505429	4479814416429
497499609#+24	3489500156429	.250134308E+29.	131468861E+34.	.998332432E-49.	501831055	140836117E+22
0420910000-01,	UU8446U84E+57,	178077283E+22.	.083301380E-78,	296163917E+23,	296135995E+22,	.082240040E-78,
9737107455-36,		147135197E-57,	142379741E+26,	602076728E-57,	244304123E+22,	139802208E-56,
244304123E+22,	219316864E-56,	244304123E+22,	~.706456141E-50,	295812636E+22,	2076346UBE+21,	.259487706E+31,
.086478261E+66,	. U61569206E+57,	.0866075338+06,	.745085350E+29,	.072027290E+57,	.101573570E+29,	.260013347E+31,
.236494396E+19.	.023269933E+28.	.06+846741E+30,	.054179535E+18,	.162523151E+30,	202153920.	.24910657E+29
.2994293925429,	. 3484452435424	23065 034	. 44 149 11 20E+24,	. 3986/3/34E+24,	- 601220203	.00-4449400.
- 469970703	- 454474449	- 476102 410	- 157598494	744381968++21	- 1802560125+21	107870470
0304294961-59.		428829154E+22.	- 626708984	413568312E+22	135059488.	745068372E+29.
1.05097961	.846413608E-71,	.153747415E-16,	231088704E+21,	413847479E+22,	454956797	642027696E-57
223408965E-56,	369799573E+22,	+26324750E+22,	132060096.	.066748943E+60,	.0904978U1E+74,	.020199309E+57,
.080710377£+06,	5	335076169E+16,	3698211	-210000016E	-01, JFUEL=	1,LA= 82.000C
• 00000000	,LC= 72.0000000	*LH= 14.0000000		, LK=	60.0000000 ,LSC=	4.000000000.4
369799573E+22.	369741927E+22,	370060350E+22,	.553012944E +68,	202109792.	.0863504235466,	.022197856E+69,
.020190529E+57,	.086710377E+66,	.090504541E+72,	.018472258E+57,	. 745087995E+29,	1.05098343	.846413608E-71,
0201854601457		4543451431438	0502284025418	4594107016428	020200000000000000000000000000000000000	745086506135
1.05099106	.846413608E-71,	.228554851E-76.	2381935836+22	118288736.	.025487556E+28	.004445567E-56
495041530c+17,	.928265770E+19.	.812+01037E+19.	.147925590E-48.	438851357	184644939E+22,	.249909145E+29
.240765724E+29,	.428835701E-47,	-0333020954E+17,	295066269E+22,	405614779E+17,	152865489E-68,	.115685007E+20,
.4479799301+29,	.497499042E+29,	.348950015E+29,	252506464.	.447979950E+29,	.497499042E+29,	.348950015E+29,
.2501343086+29,	. 151468b61E+34,	.996332432E-49.	486206055	428605325E+22,	642091036E-01,	008452671E+57,
- 2714536261+229	- 142 47474 46 424	4 90 10 40 30 E + 23 ,	-2491504456422	0833018055-78	- 246460756153	082089331E+24
682069331E+2+.	+0+938150E-37.	142379753E+26.	130681911E-36.	369575744E+22.	017091036E-01.	-1308579556+61
376954441E+22,		008440098E+57,	739754519E+21,	.236499673E+19,	.023266155E+28,	.500341554E-47,
454484940	_	123752181E+10,	120348495	220099449	794763565E-U1,	326023102E-01,
481033325c-01,LSH		120455276E	.21, .118444670E	19,611206055	, 125064962E	.21, .147267708E
020342113	182410103	5013/3291	151220103	552592113	(513(3291	20 /886139E+21,
-1846932465-39	- 4481404255424	- 741928203E-48,	013456345E-01,	174360347E-01,	458 408 355 F+22.	10 (036 /32E+23,
107273581E+23.		746510c74E+21.	957386017E+22.	368012544E+22.	107544518E+23,	443588350E+22
9514214562+22,		.2040094%4E-05,	.8031099756+57,	.745088939E+29,	1.05102921	.846413608c-71,
.3855914321-76,	470704044	1405555436+424	118161556.	.079247757E+06,	.020115501E+57,	252379712.
.745088372E+29,	1.05094528	.846+1360 bt-71,	.416798973E-70,	.226511574E+72,	.362419193E+73,	.804778659E+57,
.0808190491400	.015127479E-18,	-183104 (00E-19,	443082140E+22,	202048512.	.086331139E+66,	.0201843436+57
3597266226+22,	.80+80+1016+57,	.745088561E+29.	1.05094910	.846413608E-71,	-472206130E-76.	4430234 f8E+22, 249535448E+21,
34760348UL+22,	359942094E+22,	84609728.0	.086774654E+66,	.015101009E-18,	335570631E-19,	347085097E+22,
267984194E+41,		449920079E-19,	347160282E+22,	.020139446E+57,	252382526.	.086774654E+06,
.01510100%c-18,	454510124E-19,	347678792E+22,	258484699E+21,	.8047771636+57,	252382528.	.086091094E+60,

NUMBER MUJEL WITH VELGUITER FLAMENGLOEK AUGHENTUR AND REMOTE FLOW SPLITTER USING EMPIRICAL COMBUSTION DATA

C CASE +	RUMBLE	x F	REMUTE * EMPERI	HAREMUTE * EMPERICAL * JP4 * TABLPLOT * TEST CASE	OT*TEST CASE				
		TAPLUENCY "	C.C HERIZ	FRE DENCY =	5.00 HER12	FREDUENCY	: 10.00 HEAT	FREQUENCY :	* 15.00 HEK12
ARANIER	TO NO.	CALN	PHASE ANGLE	GAIN	PHASE ANGLE	CAIN	PHASE ANGLE	GAIN	PHASE ANGLE
1	-	.228205	-300.000	.193553	-35.2655	.158132	-50.2494	.143875	-72.9749
V.1	,	.014994	-180.000	.521610	-215.267	.420153	-236.249	.387731	-252.975
1	2	.243405	-360.000	.19355	-35.2005	.158132	-50.2494	.143672	-12.9749
2	*	.300425	-360.000	.200149	-30.6653	.212125	-47.4771	.194370	1761-65-
2	Λ	.693713	-160.000	114144.	-207.044	060764.	-219.981	141094.	-228.980
2	0	,300,25	-300.000	.253414	-57.1605	.191070	-56.9438	.152687	-73.9411
3	1	.300925	-300.000	.258971	-28.2126	.208327	-42.0312	.184773	-51.3072
	æ	.043113	-100.000	.003077	-197.550	.528113	-202-194	.527005	-204.611
3	*	.306%	-300.000-	44957	-42.1855	.141920	-62.0708	.956823E-01	11 -56.3497
P3H	10	.306925	200.000-	116862.	-28.2126	.208327	-42.0312	.184773	-51.3072
3H	11	.787193E-01	1 -180.000	.993993E-01		.127412	-171.149	.154921	-179.979
311	12	.306925	-300.000	.258747	-44.2357	.206226	44.1015	.184490	-54.5237
24	13	.300425	-360.000	168652.	-26.6518	.209617	-42.9878	.187122	-52.4698
24	7.7	.78719JE-UI	1-180.000	.404756E-01	-174.377	.110980	-179.034	.132867	-188.901
H	15	.266925	-356.000	165457.	-26.0518	.209617	42.4878	.187122	-52.9698
Z	10	1.00000	-360.000	1.00000	-300.000	1.00000	-300.000	1.00000	-360.000
	17	.386785	-160.000	. 402194	-163.465	470908	-189.946	.448445	-198.167
311	10	.226205	-360.000	.176320	-48.9488	.106195	-81.8278	.157720	-107.651
1005	*	.675421	-180.000	.098213	-186.393	.739525	-195.394	.766255	-206.030
***	20	.327217	-300.000	.277109	-20.9240	.224973	-39.6721	.201756	-48.1942
**	- 17	.214831	-180.000	104005.	-185.498	.21,257	-180.915	.239832	-191.38+
	. 77	.214851	-300.000	.172861	-30.9550	.123962	-55,1837	.101472	-02.4697
	23	.327417	-360.000	. 470240	-26.1336	.222308	-37.9603	.190759	-45.3045
•	54	.214831	-180.000	.219754	-177.710	.243964	-170.333	.283313	-179.388
•	55	.214631	-300.000	.167157	174.45-	.110943	146.7747	.889000E-01	11 -44.6708
	20	.321773	-360.000	.270532	-26.6410	.215885	-38.0264	1189617	-45.8676
	27	.3843231-01	1-180.000	.3321+96-01		.536+3+E-(	11 -1+7.521	.864977E-01	11 -156.148
^	28	10-3457975.	1-360.000	.113475	-119.928	.147459	-154.477	.152712	-172.080
	52	.315563	-360.000	.204454	-27.1715	.209180	-39.3393	.182189	140.4404
	30	.82488ZE-01	-300.000	.900220E-01	-9.88965	.103932	-33.1084	.998184E-01	1
	31	.831+476-01	-160.000	.205697	-156.359	.270523	-177.099	.287950	-192.853
	32	.309389	-360,000	.257913	-27.7460	.202085	-40.1466	.174316	-47.1625
•	33	.171+17	-360,000	.190248	-8.99710	.201661	-25.5370	.198459	T++0.++-
	34	.172282	-180.030	.291600	-108.321	.365702	-187.598	.389867	-204.569
50	35	.302,33	-360,000	450795	-28.3880	.194449	-41.0978	.165804	0160.94-
•	36	.240316	-360.000	.262593.	-9.79241	.278557	-26.5979	.279773	-43.7209
•	37	.241525	-180,000	.300117	-174.952	904044.	-194.954	.469945	-213.593
01	38	747467.	-360,000	124245.	-29.1274	.186121	-42.2575	.156439	-44.3336
01	34	.295991	-360,000	.320830	-10.7956	.340632	-27.7815	.346112	-45.0216
10	04	.291740	-180.000	. +16382	-179.562	.501424	-200.800	. 535787	-221.099
11	41	.294245	-360,000	.243278	-29.4157	.180664	42.0241	150692	-50.12+5
111	74	144647.	-360.000	.319693	-11.27.57	.339245	-28.4104	.345578	-45.7589
	40	.297740	-180.000	. +14763	-180.864	149664.	-203-147	.535052	-224.482
	0/PJ	7 4.26021	-180.000	2.33106	-169.343	2.53502	-160.163	2.85218	-153.244
	1/73	7 .743>66	2.	.747393	-7.05389	.759059	-14.2182	.775661	-21.6077
11 4	41/PJ	7 .958670	0,	104666.	-1.00302	.896013	592911	.848024	-358.757

RUMBLE MUDEL WITH VEEGUTTER FLAMEHOLDER AUGMENTUR AND REMUTE FLUM SPLITTER USING EMPIRICAL COMBUSTION DATA

RUMBLE										
O CASE	+ RUMOLE		-	MUTE*EMPERIC	AL * JP4 * TABL	M*REMUTE*EMPERICAL*JP4*TAB&PLUT*LEST CASE				
		FRE JUENC		20.00 HEN 12	FREEDENCY	= 25.00 HEK12	FREQUENCY #	30.00 HER12	FREUUENCY	= 35.00 HEKIL
PARAMTE	ER ID NO.	CAIN		PHASE ANGLE	CAIN	PHASE ANGLE	CAIN	PHASE ANGLE	CAIN	PHASE ANGLE
P1	7	135100		-49.8901	.137564	-106.379	.145630	-123.570	.101,00	-144.750
٧١	7	.372340		-204.890	.5/0725	-200.379	.392477	-303.570	.434454	-564.750
RI	1	.138166		104.6401	.157564	-100.379	.145636	-143.570	.161202	-144.750
24	4	.183925		-74.2133	.162090	-84.2916	.191490	-46.4433	.210351	-113.541
V2	5	(C)		-230.019	114+1+	-248.313	.525035	-259.204	280809.	-274.554
R2	0	.124950	0	-84.5857	.109289	-88.5627	115007	-87.5434	.143773	-97.8223
P3	1	.17150	0	-60.5512	.103302	-68.8301	.104480	-77.1635	172427	-48.7092
V3	α	CV	٥	-209.251	117110.	-215.075	.704943	-244.852	146858.	-235.501
RS	,	.10910	9	-48.2070	.135008	-61.7026	.141240	-64.3426	115567	-106.064
P3H	10	.171350	0	7100.00-	.163362	-68.8301	.164486	-77.1833	172427	-88.7092
V3H	11	.178074	0	-191.405	67+661.	-202-964	.225965	-214.872	.259123	-250.191
R3H	12	.170733		-64.8353	.1.2215	-74.2779	.10250+	-83.8204	.169170	-90.5943
PZH	13		+	-02.9441	.167881	-72.1516	.170166	-81.5574	.174347	-94.2902
VZH	14	4	1	-201.754	.169986	-214.805	.195002	-228.373	.222391	-245.430
RZH	15		1	-62.9441	.167801	-72.1516	.170166	-81.5574	179347	7067.46-
ZI.	10	1.00000	0	-360.000	1.00000	-360.000	1.00000	-360,000	1.00000	-300,000
M3	17	.45708	5	-204.761	489464.	-208.040	.606402	-213.975	.174153	169.877-
M3H	16	.15706	2	-130.732	1,1001.	-150.708	.170978	-169.085	.187931	-189.493
1000	19	.778091	1	-214.913	.638960	-220.377	1.02763	-228.613	1.30989	-245.620
44	50		2	-50.0951	.182585	-64.3049	.166826	-74.0594	.199639	-83.3255
44	21	0	5	-195.561	c01467.	-208.245	.342705	-218.342	61c00+·	-236.568
84	22	.443558E	8E-01 .	-04.3010	.105392	-82.5625	.109023	-102.276	.103593	-127.126
54	53	.18154.	2	1004.20-	.172154	-58.4228	.173205	-64.2159	.182531	-73.2073
15	54	.36335	0	-186.012	.362763	-193.396	.410478	-201.785	482784	-214.102
52	5.5	.87324	10-36	1666.04-	.795+21E-	01 -56.4604	.585957L-0	1 -58.5732	-558617E-	01 -29.4741
96	97	.17575	4	-52.6112	.163946	-57.8392	165064	-62.6085	.175465	-70.0539
94	27	.11701.	-	-170.071-	.149123	-182.645	.196536	-195.321	.261601	-214.852
86	28	.12749.	7	-181.540	.172667	-191.377	.184860	-206.746	.170952	-226.663
14	5.2	.16504.	2	-52.8303	.155243	-57.3574	.150389	-61,1318	.167446	-08.2401
17	30	.932+95	5c-01	-82.5339	1	01 -108.934	.108762	-141.254	.135772	-178.919
R7	31	.29926	8	-204.534	.320966	-216.233	.342881	-231.268	.339043	054.642-
88	25	.15099.	•	-53.2234	.1+5952	1670.76-	.140063	-59.6001	.157772	00+0.00-
200	00	.19118	9	-61.0454	.187904	1664.61-	.186101	-101.845	.175589	-130.217
88	34	*406803	2	-218.643	\$16+c+·	-232.639	.465862	-249.112	.473292	-208.000
64	35	.14751	+	-53.8900	.135464	-57.0991	.135229	-56.8649	.145584	-64.0245
61	36	.27758	2	-59.4165	814617.	-76.4945	.283436	-95.5318	.275341	-117.515
K9	37	*+9226	n	-229.843	.526801	-245.857	+96996.	-265.827	.585292	-285.827
610	20	.13089	*	124.4084	123351	-57.5681	.121395	-56.1637	.130021	-02.0380
010	55	.34097.	7	-61.3600	.357253	-77.6204	.308161	-95.6543	196895.	-115.757
810	04	.56333	2	-439.218	690409	-457.006	.651893	-276.307	.680712	767.167-
PII	41	.13641.	7	-50.2141	.121400	-54.4013	117071.	-60.0617	.123264	-63.3662
V11	45	.349851	-	-62.1545	.360348	-78.4946	.374628	-96.3218	.379610	-115.474
RII	43	.56413	2	-243.574	.607268	-262.244	.658517	-282.360	1641491	-304-128
2	6/63	N	2	-148.000	3.7++55	-140.245	4.28573	-145.669	4.80240	-140.732
P1	1/45	7 .800342	.7	6440.67-	*845385	-37.5491	.885402	-40.3803	.93+897	-55.9603
PII	41/P3		0	-355.723	.743173	-350.571	.711175	-345.878	.714877	-334.557

RUMBLE MODEL WITH VEESUTTER FLAMENGEDEN AUGMENION AND REMOTE FLOW SPLITTER USING EMPIRICAL COMBUSTION DATA

, ,,,,,	1000	FREGUENCY	FREQUENCY = 40.00 HEK12	FREQUENCY =	FREQUENCY = 45.00 HERTZ	FREQUENCY =	50.00 HERTZ	FREQUENCY :	: 55.00 HEKTZ
PARAMTER	ID NO.	GAIN	PHASE ANGLE	CAIN	PHASE ANGLE	GAIN	PHASE ANGLE	GAIN	PHASE ANGLE
P1	1	.173081	-170.412	176131	-140.012	.178902	-224.524	.18042>	-250.504
11	2	044004.	-350.414	150+1+.	-10.6119	.482125	-42.5234	.486224	-70.5039
RI	3	.173061	-170.414	176131	-190.612	.178902	-222.524	.180425	-250.504
PZ	4	.243945	-134.556	. 225819	-150.040	.227169	-177.158	.220833	-200.261
VZ	0	240609.	UC0.+47-	. 120203	-316.085	.769001	-337.388	.806295	-1.00620
R2	٥	.180057	-140.051	£ 2602.	-141.114	.230196	-167.715	.438238	-197.537
P3	1	.175250	-103.528	106901.	-118.790	.105460	-132.506	.162872	-147.710
٧3	Œ	044664.	-255.235	1.01936	-211.679	1.07178	094.067-	1.10622	-311.182
R3	,	-10+892c-	01 -108.072	.992354E-U	1 -85.5678	.162534	-107.653	.192155	-143.528
Pan	10	.175250	-103.750	.109581	-118.790	.165488	-132.508	.162872	-147.710
V3H	11	.281571	-249.280	.285111	-208.148	.284747	-285.899	.280235	-304.899
RSH	12	170397	-114.591	.163049	-128.948	.157009	-143.808	.152213	-160.021
Р2Н	113	.182925	-110.737	.177181	-126.860	.172557	-1+1-851	100691.	-158.227
VZH	1.	.245534	-266.373	412K47.	-287.202	.252425	-307-150	.252494	-328.620
K2H	15	.182925	-110.737	181771.	-126.860	.172557	-141.851	100691.	-158.227
NIC	10	1.00000	-366.000	1,00000	-300.000	1.00000	-360.000	1.00000	-360.000
5.	17	640668.	-450.608	. 420742	-272.500	+14606.	-240.962	.919805	-308.534
W3H	18	.197585	-212.038	.193766	-234.752	.187568	-254.961	.178629	-275.549
TOOL	17	1.51540	-270.359	1.54338	-294.819	1.51560	-515.730	1.52572	-335.840
P4	20	-207366	-98.0203	500407	-113.928	-201464	-128.245	£16661°	-144.052
14	17	170544	-251.150	.461072	-204.440	.471065	-280.153	.473988	
84	22	-311797c-	01 -151-028	.585011E-U	1 -159.781	.596239E-0	_	.682127E-0	_
52	23	.187274	-86.1805	.183092	-98.9692	.180628	-110.830	.180106	-124.437
45	54	.537241	-230.623	. 552505	-247.189	.559313	-262.752	.557610	-279.505
53	25	.101596	-27.5967	.140325	-48.1970	.154701	-68.1938	.161005	-83.5254
90	20	.182021	-82.7302	.179816	-94.5954	.179852	-105.300	.182716	-117.798
Vo	17	.320276	-234.649	118566.	-224.404	.389218	-272-340	.424715	-290.063
K6	28	.119604	-241.816	.704458E-01		.846492E-0	_	.982304E-01	1
1.	58	.175200	-79.5322	.17+525	-90.4893	.176755	-100.113	.182532	-111.653
2	36	.163921	-210.179	.185962	-245.753	.215495	-267.991	.253576	-289.111
11	31	.293417	-265.289	.243269	-271.770	.235767	-275.872	.219553	-282.265
P.8	32	.166060	-76.5466	.106483	-56.5900	110496	-95.1854	.178588	-105.877
88	33	.150145	-161.775	.120282	-190.851	.121808	-219.414	.129004	-251.116
88	34	*43835*	-285.463	.402158	-296.823	.396874	-307.119	.385709	-319.490
64	35	.153633	-73.6328	.154012	-82.0705	.159762	-90.2161	.169324	-100.084
61	20	.247+11	-139.253	.219865	-157.155	.206888	-175.185	.192837	-195.910
K9	37	.502274	-362.529	.537654	-510.489	.544544	-329.686	.545994	-344.596
210	36	.136980	-10.4709	108761.	-78.2430	.143454	-84.5167	.153560	-93.4052
V10	33	.350435	-134.909	.332351	-151.005	.328473	-106.812	.322449	-183.917
410	0 1	9959999	-317.064	999469.	-332,754	.672725	-347.744	.685990	-4-13434
P11	41	.128084	-71.0586	.128477	-78.2.04	.132644	-83.7012	.141703	-91.7950
V11	745	.364007	-134.940	.3+9535	-150.624	.349024	-165.859	.340849	-182.311
	4.5	.682828	-324.083	.671488	-341.133	.692547	-350.797	.709250	-13.8361
	8/73	7 5.45502	-149.278	6.01105	-155.089	0.47645	-157.952	0.79197	-103.472
P1 1	1/83	7 .987628	-66.4540	1.03862	-77.8219	1.08105	-90.0161	1.101.1	-102.794
	1/P3	1 .734284	-327,101	.757619	-319.440	.801531	-311.193	.87nn29	-304.085

RUMBLE MODEL WITH VELGUITEN FLAMEMULUER AUGMENTUR AND REMUTE FLUM SPLITTER USING EMPIRICAL COMBUSTION DATA

O CASE	*	RUMBLE VEEGOTTER F/H	ER F/H*REMUTE*EMPEKIC UINCY = 60.00 HFR 12	FREUENCY	AL*JP4*IAB&PLUI*IESI CASE FREUENCY = 05.00 HERIZ	FREQUENCY	70.00 HERT	FREDUENCY	= 75.00 HERTZ
PARAMTER	NO OI S	CAIN				GAIN	PHASE ANGLE	GAIN	PHASE ANGLE
14		.173+00	110.472-	.105442	-305-546	.166171	-332.202	.172004	-2.85192
	· cy	14.104.	2170-96-	-445852	-125.540	.447817	-152.202	.463535	-182.852
		1134011	179-071	10544	-305-540	.166171	-352.202	.172004	-2.85192
P.2	. 4	1215621	-223.879	.203880	-245.303	.202840	-206.842	.208094	-294.238
42	2	80308	-25.6082	791337	-48.2617	.817925	-71.2965	.666007	-90.4014
RZ	0	.222438	-427.998	.195174	-255.266	.171195	-280.123	.149778	-304.240
P3	1	155638	-165.313	.150369	-177.044	.155164	-191.546	.166468	-210.832
V3	10	1.01014	-332.450	1.03077	-351.472	1.03043	-10.4219	1.05463	-33.0351
K3		165348	-181-330	100424	-207.050	1	61 -199-449	.105152	-190.003
H.d	10	155634	-163-31	130 469	-177.044			166468	-210.832
HEN		261417	-373.673	743170	330.02	238700	-354.948	745247	-13.8191
1	::	111111	176 507	125072	100101	137968	-206. 293	144540	-116.204
100	13	111041	-176 525	143061	200.32	157883	-204 432	148811	-224 181
17.	12	204001.	679-411-	100001	104.334	2001010	201-102-	110001.	101.477
HZA	+	171047	-320.65	540077	-4.3(134	515577	1694-97-	617167	401410-
KZH	15	.100402	-114.825	.153861	-104.339	.13/883	-204.432	110001.	181.477-
VID	16	1.00000	-360.000	1.00000	-300.000	1.00000	-300.000	1.00000	-360.000
M3	17	.935195	-327.553	.946961	-347.069	.962512	-9.77903	.954200	-54.8152
M3H	18	.161566	-294.953	.145725	-310.379	.140564	-324.246	.143516	-340.659
TOOL	17	1.54450	-357.554	1.55417	-20.5106	1.56596	-45.5341	1.53544	-73.5049
P+	20	.192413	-100.351	.180412	-174.940	191516	-190.296	.203345	-210.141
**	21	.452000	-367.971	.425945	-345.534	.420793	-2.89033	.42737>	-23.7641
44	25		-01 -219.115		-01 -255.737	.126906E-C	-01 -285.812	-151725E-	-01 -176.727
P5	23	.17437°	-138.962	.169516	-152.191	.175772	-166.448	-182934	-185.310
45	54	.529015	-796.014	.500113	-304.706	.501093	-323.050	. >222202	-340.009
RS	5.5	.182591	-46.6546	.217080	-115.686	.248994	-140.607	.264153	-109.403
96	56	.179845	-131.395	.176502	-143.460	.181282	-155.409	.191204	-172.320
94	27	*****	-307.301	. + + 8 8 2 1	-320.712	.483792	-331.906	685645.	-345.420
R6	87	.134098	-189.078	.204885	-195.520	.278875	-211.911	.329935	-232.248
P7	58	.182045	-124.390	.180059	-135.275	.186854	-145.990	.197740	-160.283
77	30	.278468	-306.970	.294854	-327.969	. 334942	-332.726	.411656	-344.954
R7	31	.201326	-280.401	.255940	-276.066	.305658	-284.146	.360891	-300.796
PB	32	.180233	-117.633	.179968	-127.666	.184048	-137.013	.205170	-149.779
88	33	.132615	-279.117	.140924	-295.559	178561	-306-490	.248703	-323.169
Ro	34	.360036	-327.610	.378484	-331.452	9955++•	-340.726	.512432	-357.398
64	35	.17,514	-1111.315	.175096	-120.258	.184412	-128.550	.202588	-140.187
51	36	·174954	-213.919	.177281	-228.202	.206717	-240.842	198947	-274.544
89	37	.530106	-356.041	.553637	-5.25081	.632841	-17.0135	.720307	-34.4627
P10	38	.157582	-103.850	.159460	-111.903	.170288	-119.159	.188458	-129.624
V10	39	.311938	-199.027	. 320827	-212.310	.352633	-228.493	.386216	-249.336
RIO	04	.680413	-18.2001	.712677	-29.5164	.803085	-42.9865	.905433	-61.0788
P11	41	.145650	-101-110	.145641	-109.090	.154596	-115.214	•171506	-124.433
111	45	.339115	-190.885	.350141	-209.556	.384878	-224.734	.421459	-244.342
RII	43	.706220	-28.6071	.740057	-40.6879	.834217	-54.7946	.940242	-13.4411
V3	8/P3	7 6.91826	-169.143	0.85498	-174.428	0.64088	-178.876	6.33533	-182.203
PI	1/63	7 1.11412	-115.758	1.10024	-128.502	1.07094	-140.657	1.03320	-152.020
P11	41/P3	7 .931970	-298.390	896896.	-292.052	.996341	-283.669	1.03026	-273.601

RUMBLE MUDEL WITH VEEGUTTER FLAMENULDER AUGMENTOR AND REMOTE FLOW SPLITTER USING EMPIRICAL COMBUSTION DATA

RUMBLE

U CASE 4	RUMULE VE	EGUITER F/H#R	10	AL*JP+*TABLP	LUT+TEST CASE						1
PAKAMTER 10	ID NO.	GAIN	PHASE ANGLE	GAIN	PHANT ANGLE	SAIN	9 4 4	ANGI F	FREQUENCY =	D. H.	AMC F
P.1		.17,984		3.		3.			0.	0	
٧1	~	.466178	-217.118	0.	0.	0.	0.		0.	0	
K1	•	.172984	-37.1178	0.	0.	0.	0.		0.	?	
P.2	,	.207600	-521.20+	0.	0.	0.	٥.		•	•	
72	2	.891023	-129.383	0.	0.	0.	0.		0.	•	
82	0	.131400	-325.310	0.	0.	0.	0.		••	0.	
PS	1	.174050	-234.569	0.	0.	0.	•		0.	0.	
45	က	1.04384	-28.8669	0.	0.	0.	0.		0.	0.	
R3	5	.142622	148.627-	0.	0.	0.	0.		0.	3.	
РЗН	10	.174056	-234.569	0.		0.	0.		0.	0	
<b>УЗН</b>	11	.243018	-36.0078	0.	0.	0.	0.		0	0.	
R3H	12	.149560	-250.059	0.	0.	0.	0.			0	
P2H	15	.170303	-246,315		٥.	0.	0.		0.	0	
V2H	14	.230615	1046-11-	0.	9.	0.	0.		0.	0	
K2H	15	.176363	-246.315	0.	0.	0.	0.		0.		
VID	16	1.00000	-360.000	0.	0.	0.	0.		0.	0	
M3	17	.903250	-60.2847	0.	0.	0.	0.		0.	0	
M3H	18	.147048	670012	0.	0.	0.	0.		0.	•	
COUT	61	1.45509	-101.873	0.	0.	0.	0.		٥.	9.	
P4	20	.210204	-234.040	0.	0.	0.	0.		0.	0.	
*	2.1	.422141		0.	0.	0.	0.		0.	0.	
**	22	.323577E-61		0.	0.	0.	0.		0.	•	
P5	23	.186310	-208.216	0.	0.	0.	٥.		0.	•	
45	54	.535175	421755	0.	0.	0.	0.		0.	0.	
RS	55	.259037	-197.799	0.	0.	9.	0.		•	•	
P6	70	.194308	-192.355		0.	0.	0.		0.	0.	
9/	77	.615808	-2.11035	٥.	9.	0.	0.		0.	0.	
R6	28	.346981	-251.572	0.	0.	0.	0.		•	•	
74	54	-205514	-177.870	0.	0.	0.	0.		0.	•	
77	20	.498078	-1.44693	0.	0.	0.	0.		0.	0.	
R7	31	.377+34	-318.068	0.	0.	0.	0.		0.	•	
Pa	32	.214769	-105.635	0.	0.	0.	0.		0.	0.	
٨٩	33	.325124	-344.090		0.	0.	0.		0.	0.	
RB	34	.539046	-16.5094	0.	0.	0.	٥.		0.	0.	
64	33	.215023	-154.760	0.	0.	0.	0.		0.	0.	
61	36	.274605	-300.883	0.	0.	0.	0.		0.	0.	
89	57	.766+98	-54.4258	0.	0.	0.	0.		•	•	
P10	36	.201983	-142.446	0.	3.	0.	0.		0.	0.	
010	24	.401147	-272.104		0.	0.	0.		0.	0.	
R10	04	.965035	-81.2040	0.	0.	0.	0.		0.	0.	
P11	1+1	.185218	-136.626	0.	0.	0.	0.		0.	0.	
111	745	.437263	-265.877	0.	0.	0.	0.		0.	0.	
R11	43	1.00202	144.0457	0.	0.	0.	0.		0.	0.	
	8/P3 7	2.99716	-184.297	0.	0.	0.	0.		0.	0.	
	1/23	.493845	-102.548	0.	0.	0.	0.		0.	2.	
	1/63 7	1.06413	-262.057	0.	0.	0.	٥.		0.	•	

RUMBLE MODEL WITH VEEGUTTER FLAMEHOLDER AUGMENTOR AND REMOTE FLOW SPLITTER USING EMPIRICAL COMBUSTION DATA

RUMBLE									
O CASE 4	4 KUMELE	KUMELE VEEGUTTER F/H	*REMUTE*EMPERI	CAL*JP4*TABE	EN F/H*REMUTE*EMPERICAL*JP4*TABEPLOT*TEST CASE	A Judgmen	11000 00 011-	> 045mm 303	110 to 00 to 11
DACAMTEE	ON 01 93	TREGOUNCE	THE DOOR	TAE COUNC.	THE PARTY	NAC PART	TINO DE PER	200000	DUACE ANGLE
- ANA	2	NINO	THASE ANGLE	NITE	THASE ANGLE	NIAO.	THASE ANGLE	NINO	THASE ANGLE
1	-	.16/903	-110.596	.145412	-185.699	+17741.	-251.140	.148019	-314.433
7	7	.452484	-240.540	.386645	-5.69867	.383410	-71.1399	.400516	-134-453
RI	3	.167903	-110.596	.143472	-185.699	.142274	-2>1.740	.148614	-314.453
P2	4	.198965	-23.8949	.108655	-88.0072	.167416	-145.976	.176028	-194.700
72	2	*89258*	-190.470	.174722	-205.402	.768541	-325.337	. 190965	-21.8993
42	9	.145252	-8.40342	.167383	-75.0256	.184796	-143.664	.172123	-208.802
P3	-	.181027	-289-154	.160944	-347.271	.159758	-36.9768	.160681	-82.7794
٧3	n	976508	-114.144	.812549	-109.447	.805182	-214.996	.862869	-257.861
83	6	•102065	-302.788	115708	19.235	.179304	-37.3231	.113423	-112.153
P3H	10	.181027	-289.154	.160944	-347.271	.159758	-36.9768	189091	-82.7794
VSH	11	.238787	-65.3115	.210532	-137.053	.214881	-180.566	.227804	-220.629
K3H	12	.150037	-300.500	.128130	-5.76687	.121608	-50.4495	.110370	-102.993
PZH	13	.184341	-303.671	.105718	-2.64031	.167023	-53.2692	.171252	-100.002
VZH	14	.219595	-136.081	.181636	-196.047	.170065	-246.705	.162489	-292.766
RZH	15	146481.	-303.671	.165716	-2.64031	.167023	-53.2692	.171252	-100.002
OIN	16	1.00000	-360.000	1.00000	-360.000	1.00000	-360.000	1.00000	-360.000
M3	11	.875144	-113.133	.714929	-174.118	.626068	-214.330	.771824	-253.110
HSH	18	.160051	47.1773	128557	-99.6617	.177894	-140.097	.202115	-189.955
1000	14	1.35570	-160.605	1.07273	-228.041	.894261	-274.059	1.08029	-318.325
P4	50	.215780	-288.31>	.190008	-346.117	.187514	-34.8826	1190811	-79.8690
**	21	945004.	-99.7361	.340140	-152.970	.339815	-197.087	.360575	-238.597
84	22	-234735E-	01 -291.033	.366431E-	-01 -507.551	-508301E-	-01 -37.9154	.236481E	-01 -150.250
P5	23	.182225	-260.245	.149883	-314.716	.136956	-358.714	.129330	-37.4493
45	54	.559473	-47.2150	.521023	-98.4140	.550300	-142,322	.595866	-183.772
RS	52	.271318	-556.256	.221630	-320.587	.183635	-13.1121	.214421	-04.3402
94	56	.182+82	-237.032	.138454	-282.408	.114570	-319.012	.102802	-351.962
94	27	619121.	-39.0012	.703406	-79.9804	-674762	-114.969	.621321	-150.358
Re	58	.345509	-290.031	.182164	-319.351	.135519	-300.319	.180871	-276.128
14	56	.197140	-215-661	.155390	-252.045	.133608	-279.491	.125221	-306.865
77	30	118499.	-38.7257	.705373	-76.9512	.714438	-111.467	.689741	-142,458
R7	31	.359708	-354.020	.188239	-17.9097	.167724	-350.904	.281355	-340.658
88	32	.216379	-196.874	.184136	-430.529	.172309	-254.103	.170044	-479.510
88	33	.478558	-28.8985	. 520604	-74.3315	.545424	-108.184	53>008	-139.168
RB	34	.531145	-56.1065	.338079	-91.6337	.219132	-96.3740	•20309₺	-73.4356
64	35	-526154	-185.004	.205100	-214.312	.204135	-236.869	.208154	-261.671
64	36	.344408	-356.889	.326836	-50.3000	.311679	-86.7214	.284652	-117.368
89	37	.189742	-74.8817	. 598959	-131.445	.492035	-150.902	.425293	-101-472
P10	38	.220378	-170.490	.210826	-198.342	.218429	-220.873	.225045	-245.766
010	39	016004.	-319.304	.309620	-1.33695	.268477	-28.8746	.248483	-49.7595
R10	0.4	1.00757	-122.213	.821716	-158.513	.745054	-161.756	.711954	-200.834
PII	41	.207004	-162.442	.203861	-190.139	.212749	-212.737	.218010	-237.528
711	745	.431545	-309.970	. 530645	-347.964	.288970	-11.6509	.278470	-30.1089
RII	43	1.04421	-130.098	. 853550	-173.130	.780209	-197.281	.757147	-217.728
×3	8/P3	7 5.39427	-184.990	5.04800	-182.175	5.04003	-176.019	5.37006	-175.081
14	1/63	1 .927502	-181-442	644168.	-196.427	.890561	-214.763	.924930	-231.673
111	41/13	1.14681	-233.288	1.20006	-202-868	1.33170	-175.761	1.35678	-154.748

RUMBLE MULEL AITH VELGUITER FLAMENULLE AUGMENTUR AND REMOTE FLUM SPLITTER USING EMPIRICAL COMBUSTION DATA

		F. Y. M. F. L. L. L. V. C. V.	11 40 00 15-67	FRELLIFINGY	=140.00 HERTZ	FREDUENCY	=150.00 HENTZ	FREGUENCY	=160.00 MENTE
			120.00 LENIE					NI V	
PAKAMTER	to Me.	NIAS	PHASE ANGLE	CAIN	PHASE ANGLE	CAIN	PHASE ANGLE	2745	PHASE ANGLE
14	-	195001	-12.4752	.208734	-86.1497	.244923	-177.065	105766	-242.043
V.1	2	.527020	-1942.475	.72+215	-208.150	. 6600*8	-327.604	.447269	-62.0427
R1	2	195001	-14.4754	.208734	-86.1477	.244923	-177.005	100,000	-2+2.0+3
24	,	.234879	-241.515	.347735	-307.041	. 304541	-26.3645	.210543	-81.4858
V2	^	1.01144	-73.5328	1.32025	-142.404	1.13812	-224.526	.716250	-207-197-
R2	٥	167701.	-457.573	. 400922	-302.565	.256665	-13.4606	.21+769	-77.6546
63	7	.157020	-122.018	.251750	-175.404	.214438	-240.711	.153036	-279.865
V3	o	1.17961	UBC-147-	1.66500	-356.705	1.52199	-71.0186	c90166.	-141.409
KS	,	.113233	-105.800	140805.	-101.921	w	-01 -227.774	165115	-205.709
PSH	10	.197620	-124.018	.251756	-175.904	.219958	-240.711	.153030	-279.885
No.	11	.304364	-254.575	. +26243	-304.004	.424428	-6.14890	.332,30	-45.2778
RSH	12	.135591	-142.754	.102115	-190.946	.131526	-261.492	-838431E-	01 -299.436
P2H	13	.216140	-140.201	.284287	-145.226	.258773	-261.546	.187064	-303.034
VZH.	14	.190052	-331.263	.234521	-24.5026	.208261	-82.9753	.157256	-119.317
82H	15	.210140	-1+0.201	.204567	-195.228	.258773	-261.546	.187664	-303.034
Z	Io	1.00000	-360.000	1.00000	-300.000	1.00000	-360.000	1.00000	-300.000
43	11	1.06890	-293.417	1.45788	-355.964	1.43108	-72.5915	.868359	-127.781
134	18	.281075	-228.028	561605	-261.747	.409411	-348.040	.319800	-30.6674
1001	1,1	1.46520	-11.2703	1.43817	-75.0956	1.89008	-100.489	1.14324	-226.437
**d	50	.238062	-119.102	110006.	-175.177	.270513	-236.947	.185262	-279.149
**	2.1	+6701+	-275.837			.581491	-36.7233	.394171	-76.9908
R4	77	-248345E-	01 -347.304	-404984E-	-01 -+0.0638	.119240	-117.613	.116319	-193.326
5	63	.15174	7679.80-	.189030	-114.844	.164539	-175.632	1108777	-207.401
15	*7	.761758	-220.384	1.03940	-272.377	.929885	-335.756	• 645040	-12.9330
51	52	.234330	-124.000	.245580	-193.775	.191132	-300.574	-953085E-	01 -46.7194
90	50	.127905	-41.1516	.178143	-61.1524	.173524	177.151-	.127614	-100.448
9/	17	.085289	-187.705	.782802	-245.326	084859	-316.359	.458740	-3.63682
91	97	.400352	-296.412	£24045.	-344.270	.50034+	-52.4831	181907	-96.3954
1.	67	195661.	-336.025	.209473	-20.5844	199098	-90.2034	.149271	-125.753
-	30	.753650	-174.084	.615572	-217.107	.590275	-274.187	.341918	-204.093
1.1	31	\$61005.	-4.34061	846048.	044.5770	.729965	-108.521	174014.	-125.315
9.6	35	.204105	104.106-	.208244	-355.643	.239921	-58.3876	.170570	-94.0590
18	33	510965.	-164.389	.708444	-202.017	.617256	-252.481	.435317	-279.535
81	3+	.+21960	-81.0544	.663397	-120.856	.594998	-174-173	.399888	-184.219
5	35	.257312	-286.277	. 324498	-334.412	.280883	-34.7104	.189690	-68.6395
61	26	198676.	-136.469	162054.	-175.518	.444977	-227.686	.312381	-258.051
89	37	.578261	-172.643	. 739149	-209.901	.676382	-262.550	.420888	-217.428
110	20	.276062	-271.829	.341364	-310.374	.286670	-14.2820	.180846	-45.1077
110	25	.330040	-72.0628	.445668	-115.761	.390487	-172.723	.273184	-196,122
0110	2,	.921683	-221.469	1.20420	-262.627	1.04560	-317.034	.717438	-339.593
111	1,1	.204144	-262.515	.323095	-305.782	.268962	-2.56207	.170472	-35.3066
111	14.	.374911	-52.7059	.502577	-46.3593	.445397	-152.911	.319252	-177.431
	4.5	781784.	-240.345	1.29633	-283.392	1.13238	-339.659	.784444	-4.56944
٧,	8/10	7 5.90380	-175.562	0.01370	-180.741	6.92008	-190.308	6.51525	-201.523
	1/63	\$500AA.	-250.457	1.06746	-272-185	1.11360	-240.954	1.08450	-322.757
	1/P3	7 1.33522	-146.496	1.28340	-129.818	1.22290	-121.852	1.11394	-112,421

RUMALE MODEL WITH VEEGUTIER FLAMEMOLDER AUGMENTUR AND REMOTE FLOW SPLITTER USING EMPIRICAL COMBUSTION DATA

MBLE									
*	RUMELE	RUMBLE VEEGUTTER F/H	ER F/H#REMUTE*EMPERI	CAL*JP4*TABE	L*JP4*TABEPLOT*TEST CASE		160 00 15017	* Own and Codes	
		-	#1 70.00 HEX 12	-	TROPO HERIT	5	DIACE ANCIE	TATE OF STATE OF STAT	PLANE ANGLE
AKAMICK	TO NO.	CAIN	PHASE ANGLE	CAIN	PHASE ANGLE	NIAN	PHASE ANGLE	NIVO	PHASE ANGLE
-	-	.135213	-303.800	.119927	-5.71000	.112892	-78.5336	.10087-	-148.229
1	7	.304387	-123.801	261676.	-185.710	.304234	-258.533	.271848	-328.529
1	9	.135213	-303.800	176611.	-5.71000	.112892	-78.5336	.100674	-148.229
2	4	174747	-133.116	.157579	-185.785	.150202	-249.595	.135281	-310.435
2	^	.535958	-332.865	.434278	-23.6839	.375406	-83.5044	.314631	-138.277
2	٥	.17+152	-142.743	.124606	-203.069	.892596E-0	1 -255.770	W	-01 -297.284
•	1	.136186	-317.335	.134740	-359.019	.139455	-54.0641	.132617	-109.163
•	0	.750712	-167.741	.585010	-213.315	.461052	-266.315	.339729	-309.791
	•	.123403	-345.590	-606763E-	-01 -352.110	.119092	-49.0461	u	-01 -121.463
РЗН	10		-317.335	.134740	'	.139455	-54.6641	1132617	-109.163
/3H	11	.325460	-84.1368	.345826	-127.352	.379740	-184.230	.381457	-239.727
13H	12	9982E-	-01 -333.973	H	-01 -10-8767	-601490E-0	1 -60.0534	W	-01 -106.847
PZH	15	.17274+	-343.229	175627	-27.6523	.186396	-85.9023	.181877	-142.929
VZH	14	.154501	-157.290	.165521	-201.507	.181858	-260.269	.181532	-317.928
24	15	.174744	-343.229	175627	-27.0523	.180390	-85.9023	.181877	-142.929
Z	10	1.00000	-360.000	1.00000	-360.000	1.00000	-360.000	1.00000	-360,000
•	17	•627906	-168.754	.540830	-217.554	.373307	-277.441	.256762	-312.511
H	18	.308702	-72.2021	.323026	-117.483	.349509	-176.044	.346048	-232.900
100	19	.803085	-279.289	.707414	-340.030	.534038	-60.0382	.336046	-124.902
**	20	+16191.	-316.427	.158010	-357.798	.161173	-52.4553	.153234	-105.688
	21	337495	'	.330494	-149.771	.352820	-200.475	.358510	-250.916
	22	.914719E-0	•	.113281	-286.763	.129202	538967	.107468	-01.9405
	53	.893227E-01	•	.818320E-(	01 -267.287	.834948E-0	1 -306.090	ú	-01 -348.205
	54	.567320	•	.563824	-84.8767	.584419	-136.760	.559728	-187.597
	52	.832537E-01	•	159461	-186.341	.148758	-267.539	.136603	-326.879
	50	.121144	-186.020	.131302	-212.837	.150548	-252.855	.154454	-294.911
	23	1017+4.	-39.7290	T+1984.	-73.7518	.532569	-114.409	640064.	-151.260
	28	8711E-	01 -117.024	.115834	-331.275	.177689	-12.1522	.187392	-24.9062
	53	.149038	-154.669	.168343	-184.878	.194212	-226.956	117591.	-268.593
	30	-257242	-334.093	.217493	-8.21642	*5007*	-55.5236	.187802	-95.8065
	31	.384763	-129.412	.455780	-139.186	.518291	-171.766	.433073	-199.850
	32	.161816	-125.536	.173498	-157.753	.189493	-200.336	121971.	-240.578
	33	.360235	-301.875	.371898	-323.791	.397858	-354.260	.410832	-20.4737
	34	.424500	-192.613	.587342	-210.167	608169	-244.790	1055407	-274.248
	35	.169440	-97.4749	.168884	-127.412	.172077	-166.567	.153780	-201.428
	36	.283147	-278.078	.300998	-297.108	.380607	-330.039	.414960	-6.27755
68	27	.434722	-286.150	.531692	-302.741	.618411	-337.066	.585299	-8.11134
P10	38	126651.	-70.5910	1151977	-96.0328	.150493	-129.089	.138799	-156.455
0	39	.280735	-210.117	.332697	-241.502	.386543	-281.735	.380464	-340.134
0	40	.704085	-358.084	.795639	-20.1029	.894784	-57.0905	.801887	-91.1905
11	1+	105041.	-55.4489	.129478	-76.8592	.130570	-105.127	.128547	-129.579
11	42	.325619	-199.440	.374470	-226.062	.418971	-265.958	.396911	-302.946
	43	.769350	-25.6085	.862712	-50.4689	.962220	-88.5134	.921628	-123.869
	8/P3	7 5.51238	-210.411	4.34170	-214.290	3.30610	-211.651	2.56173	-200.628
P1 1	1/63	1 .992052	-346.405	880088	-6.69116	.809522	-23.0094	.760642	-39.0663
	41/P3	1 1.03168	-98.1138	846096.	-77.8403	.936289	-50.4628	.969308	-20.4150

NUMBER MUDEL WITH VELOUTIEN FLAMEHULDEN AUGMENTUR AND KEMUTE FLOW SPLITTER USING EMPIRICAL COMBUSTION DATA

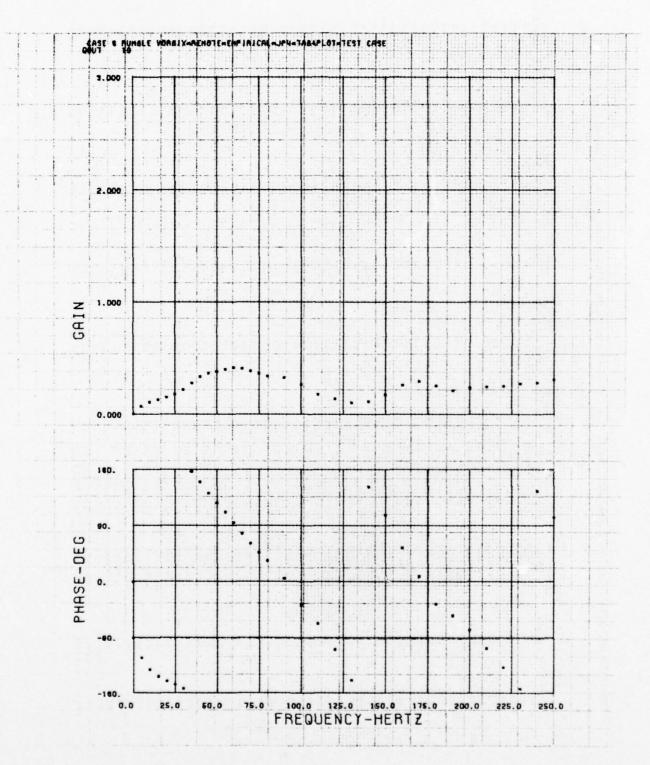
UMOLE										
O CASE 4	. NUMELE		SUTTER FINE	V_cGUTTLN r/M*KEMUTc*EMPEKILAL*JF4*IAB&PLOT*TEST CASE	LAL*JP4* TABEP	LOT*ILST CASE				
		-		=210.00 HER12	۳	-220.00 HERTZ	FREGUENCY	=250.00 HERT	TREADENCY	=240.00 HERTE
PAKAMIEK	To vo.		CAIN	PHASE ANOLE	CAIN	PHASE ANGLE	CAIN	PHASE ANGLE	CAIN	PHASE ANGLE
1	1		. 770657E-UI	1 -213.049	.109939	-471.762	.131800	-336.856	.154612	-43.5556
-	2		.263501	-33.0480	. 276275	-91.7818	.355190	-156.856	.410000	-223.550
-	•		.9 1005 1E-U	1 -213.049	.109939	-271.782	.131800	-336.856	.154612	-43.5530
	,		.131355	-6.48002	.147513	-50.4500	.175535	-112.672	.203444	-170.378
2	۸		206967.	-180.003	. 541505	-229.308	.434972	-279.270	.554920	-332.776
2	0		.116047	-354.641	.1+77+8	-56.2041	.157861	-123.823	.137800	-181.925
3	1		940161.	-154.741	.145123	-204.290	.164085	-254.305	.175534	-304.050
3	α		1.29055.	-340.623	.364176	-5.26679	.527906	-43.3369	.742520	-89.7213
3	,		.881191E-UI		145997	-203.503	.113172	-274.987	.112455	-291.326
РЗН	10		.131349	-159.741	.145123	-204.290	.164085	-254.305	.175534	-304.058
34	11		. 198019	-491.195	.404483	-330.093	.553285	-27.8022	.621833	-78.8428
34	12		.55775Bc-0	1 -149.696	. 651717E-01	1 -180.300	-805113E-	01 -250.212	w	-01 -475.718
2H	13		.185110	-196.042	.210489	-245.203	.24>111	-293.941	.269887	184.846-
2H	14		.167310	-11.6195	.210409	1562.65-	.255409	-112.541	.285186	-165.816
24	15		.185116	-190.046	.210489	-243.203	.245111	-245.441	.269687	-348.581
IN	lo		1.00000	-360.000	1.00000	-300.000	1.00000	-360.000	1.00000	-360.000
9	17		.217256	-347.305	.230392	-353.614	.400230	-32.3005	.639323	-86.0057
5H	10		.356570	-285.049	. 409008	-354.178	.479835	-24.1347	.530708	-75.8330
20,1	15		107275.	-169.660	.152770	-265.963	7	01 -193.116	.225255	-255.862
	50		.152244	-155.333	.109142	-198.013	.195005	-247.484	-213254	-296.680
1,4	2.1		.365,063	-295.676	******	-341.441	.582842	-30.4003	.687580	-81.5627
	22		110451	-114.859	.131550	-171.563	.114743	-226.966	.119853	-268.728
P5	52		. 454554-U.	1 -20.7504	.123304	-62.6303	.162984	-100.655	.201423	-152.782
	47		250045	-434.669	. 008989	-475.746	.080060	-321.878	.727189	-7.82563
	52		1154490	-24.5691	.146893	-74.0354	.174525	-111.927	.216895	-164.817
•	50		159015	-337.600	.182722	-18.4297	.219499	-67.3102	147445.	-116.561
•	2.1		957144	-103.446	.411748	-210.959	.400482	-245.087	.400118	-282.576
	87		.201819	-32.5702	248467.	41.7551	.370813	-71.8842	.414586	-98.5127
	23		.187703	-305.017	.196770	-346.715	.212163	-32.4201	.221756	-76.7131
	20		.201326	-128.640	.262238	-125.059	.410040	-193.200	•553000	-233.975
	10		.314254	-421.550	.240321	-221.917	.233698	-226.484	.283225	-225.404
	32		.103900	-277.350	.161368	-204.134	.164012	-346.433	.166694	-22.7471
	33		+71c6+·	60.4663	. 502322	-94.6012	.590244	-137.877	.063713	-183.314
	34		.580942	-248.580	*16009·	-315.036	.637718	-539.730	+15189.	-2.73118
	35		.138014	-230.269	.142657	-252-121	.166152	-281.031	116661.	-314.070
**	30		111144.	-42.5513	.499224	-75.8510	.580512	-116.740	.638059	-158.351
89	27		.522.785	-35.0300	\$155.55	-54.7589	.518110	-80.5341	.537767	-102.112
01	36		3900+1.	-179.000	.169432	-<01.134	.219011	-234.379	7026970	-271.949
2	25		.300724	-356.197	.372299	-27.9509	.387571	-67.1150	. 390455	-104.576
01	10		.807262	-124.306	. 030472	-148.803	.873990	-182-105	.907458	-214.363
11	1+		139757	-153.549	.175476	-177.776	.227109	-213.790	.273985	-252.936
111	74		.361683	-336.479	.359001	-3.93053	.365184	-37.1404	.376489	-080.99-
	4.		161700.	-155.650	.072004	-182.722	.957181	-216.346	1.02624	-2+9.380
	OFF	1	15002.7	-181.000	c+60c-7	-100.977	3.21726	-149.05	4.23008	-145.063
Pl	1/2	,	.743560	-53.5077	. 157555	1164.10-	147508.	. 84.2507	.840807	-94.4473
	1/63	1	1.06461	-353.808	1.20915	-333.480	1.38409	-319.485	1.56086	-208.876

KUMBLE MULEL ALTH YELGUITER FLAMENULUEN AUGMENTON AND REMUTE FLUM SPLITTER USING EMPIRICAL CUMBUSTION DATA

Marketty 10 kg. 1 (1972)	RUMBLE		0.177.00		Carlo Maria San St. Carlo									
1	2000	* AURELE	TAELUE	NCY =	250.00 HERTZ	FREUDENCY	- 0.0	HER TZ			HEKTZ			HFR TZ
1	PAKAMIL	K ID NO.	GAIR		PHASE ANGLE						ANGLE			ANGLE
12   12   12   12   12   12   12   12	14	1	.losi.	20	-110.073	0			0.	0		0	100	
1	11	7	.445.	11	-270.075				0	0		0	3	
12/24   12/24   12/24   14/2	17	7	.1041.	28	-116.070	0.	0.		0.	0.		0.	0.	
10   10   10   10   10   10   10   10	2.	1	.2125	5+	-234.698	0.	2.		0.	0.		0.	3.	
1,249ev	12	۸	.6449.	5.5	-54.6393	0.	?.		0.	0.		0.	0.	
1   10   10   10   10   10   10   10	71	٥	.12936	0.0	-225.740	0.	0.		0.			0.	?	
1	3	-	10701.	20	FUC.TCC-	?	0.		0.	0.		0.	0.	
1	13	œ	.4017.	35	-146.266	0.	3.		0.	3.		0.	2.	
1	13	,	.1433	76	-0.07400	0.	0.		0.	0.		0.	0.	
11 100264 3 125.95	34	10	.1670	22	-357.309	0.	0.		0.	0.		0.		
1	ISH	11	.6104	33	-133.448	0.	0.		0.	0.		0.	9.	
13   26247   2447124   0   0   0   0   0   0   0   0   0	134	12	.1024	90	-326.595		0.		٥.	0.		0.	0.	
1. 286.17   24.776.9	2H	13	.2037	1+	-44.7019	0.	0.		0.	0.		0.	0.	
15   1.00000	2H	-	.2820	11	-244.903	0.	0.		2.	0.		0.		
1	н7	2	.2037	14	-44. 7019	0.	0.		0.	٥.		0.	0.	
17   17   17   17   17   17   17   17	N	0	1.000	00	-360,000	0.	0.		0.	0.		0.	0.	
18	2	1.1	. 1975	56	-134.573	0.	?		0.	0.		0.	0.	
22	34	18	.5193	24	-130.880	0.	0.		0.	0.		0.	0.	
22	100	7	.4073	25	-309.448	0.	0.		0.	0.		0.	0.	
22	4	20	.2084	13	-349.471	?	0.		0.	0.		0.	0.	
22	,	51	.7170	90		0.	0.		٥.	0.		0.	0.	
23	•	7.7	.9860	44E-0		0.	0.		0.	0.		0.	0.	
24	•	23	.2175	10	-204.366	0.	٥.		0.	0.		0.	0.	
25	2	54	1699.	10	-36.6293	0.	0.		0.	0.		0.	0.	
28	5	25	.2232.	58	-21+.749		0.		0.	0.		0.	0.	
27	•	97	7507.	13	-108.730	0.	2.		0.	0.		0.	?	
28	9	2.2	.3814	97	-5.8.496	3.	0.		0.	0.		0.	0.	
24 - 212570 - 1272280	9	58	.3761	11	-131.436	0.	0.		0.	0.		0.	3.	
31		57	.2123	0	-127.280	2.	0.		0.	0.		0.	0.	
32		30	1140.	10	-280.610	•			0.	0.		0.	•	
35		16	.3419	**	-241.654	0.	0.		0.	•		0.	0.	
35		25	4401.	-	-61.5/3/	0.	0.		0.	•		0.		
35 - 221734 - 355.125	0 0	25	6100.	2	-436.184		0.		0.	0.		0.		
36	n	**	. 1055	200	-51.4165		0.		0.	•		0.		
37 .555075 -127.429 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0		200	1177	000	-355.169				2.			0.	0.	
30		000	20208	22	-202-369		0.		0.	0.		0.	0.	
40			00000	2	674-171-		0.		2.	0		0.		
40	2	00	1747.	10	-315.400				0.0	0.0		0.	0.	
41.72 7 1.72615 -299.521	10	100	415%		-240 377									
42 .381572 -102.235 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0	111	1	.2683.	200	-296.830									
45 1.04436 -266.225 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0	11	7.5	.3815	72	-102.435	0.	0		0					
8/P5 7 5.39754 -148.955 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0		4.5	1.044	30	-286.225	0.	0			0.		0		
0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0		8/P3	7 5.397	34	-148.953	0.	0.		0.	0		0	3	
. 0. 0. 0. 0. 0. 1.726.15 -289.521 .0		1/2	7 .9823	48	-119.509	0.	0.		0.	0		0.	??	
		41/P3	7 1.726	15	-299.521	0.	0.		0.	0.		0	0	

RUMELL MODEL WITH VESCUTIER FLAMEHULDER AUGMENTUR AND REMOTE FLUM SPLITTER USING EMPIRICAL COMBUSTION DATA

	CASE 4 RUMBLE VEESUTT	VECOUTTEN FYHAN	EN TYMEROMOTEREMPERIONELE OPTENDENCY # 0.0 HERI.	TKTUITNOY =	O-O HERT.	FRECUENCY =	0.0	HER TZ	FREDUENLY =	0.0	HER 12
1,228.00   1,000.00	ID NO.		PHASE ANGLE		PHASE	GAIN			GAIN		GLE
130.024	-	c628277	73U7y1t-01			0.	0.		0.	•	
120x202   130x202   130x202   130x202   130x202   130x202   130x202   130x202   130x202   130x20   1	~	+65+10.	-160.073	0.	0.	0.	0.		•	0.	
130924 130924 130924 130924 130924 130924 130925	2	.228205	730 791c-01	0.	?	0.	?.		0.	•	
309924 309924 309924 309925 309925 309925 309926 30	4	.300924	10-2641040-	0.	0.	0.	0.		•	•	
1309224 - 17109284-01 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	^	211260.	-100.057	٠.	9.	0.	0.		•	0.	
130924	0	.300,24	772092E-01	0.	0.	0.	0.		0.	٥.	
100922	7	.306724	340078E-01	. 0.	0.	0.	0.		0.	0.	
300264 - 3940126E-011 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0	a	.693713	-180.037	0.	0.	0.	٥.		•	٥.	
300   24   179   24   170	,	.306924	89v152E-01	0.	0.	0.	0.		0.	0.	
1307954 - 1179.949	10	.300924	590078E-01	0.	0.	0.	0.		0.	0.	
13002441510222-01 -6	11	.787193E-UI		0.	0.	0.	0.		0.	•	
130924	175	.300924	-		0.	0.	3.		0.	2.	
100,000   170,	13	.300924	598577E-01	0.	0.	0.	0.		0.	0.	
3.0.924 - 599578-01 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	1,			0.	0.	0.	0.		0.	0.	
1.00000	12			0.	0.	0	0		0.	0.	
179.995   179.		1.00000	-300.000	0.		0.	2		0.	0	
237217	17	280738		0.	0.	0.	0.		0.	0.	
23.22.17	13	507877		0	0.	0	0				
327277 -327277 -214831 -774926-01 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0	10	-075421		0.	9.	0.	0		0	0	
.214831 -180.008	20	.327217		0.	0.	0.	0		0	0.	
214831 -779526E-U1 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0	21	.214831		0.	0.	0.	0.		0.	•	
3272175480c7E-J1 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0	22	.214831		9.	0.	•	0.		0.	0.	
214831 -179.988 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0	23	512726.		0.	0.	0.	0.		0.	?	
214631740839E-01 .0 .0 .0 .0 .0 .0 .0 .35451773536171E-01 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0	54	.214851		0.	0.	0.	0.		0.	0.	
311773258171E-01 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0	25	.214631		0.	0.	0.	0.		0.	٥.	
356514E-01 -177.977 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0	27	.321773		0.	0.	0.	0.		0.	•	
379742E-01401321 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0	1.7	.384014E-01		0.	0.	0.	0.		0.	•	
3158035003401-01 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0	23	.379740E-UI		0.	0.	0.	0.		0.	0.	
.8248666-011123016-01 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0	5.3	.315863		0.	2.	0.	0.		0.	•	
331507c-01 -175:401 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0	30	.84480bt -01		0.	0.	0.	0.		0.	0.	
309369579990E-01 .0 .0 .0 .0 .0 .0 .0 .0 .172417108113c-01 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0	15	.8315071-01		0.	0.	0.	٥.		0.	°.	
172283 -17417 -1061132-01 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0	35	.304384		0.	0.	0.	0.		0.	•	
.172283 -174417 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0	33	11+171.		0.	0.	0.	0.		0.	0.	
302233591715E-01 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0	34	.172283		0.	0.	0.	0.		0.	0.	
240316 -121564E-01 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0	35	.302233		?.	0.	0.	0.		2.	٥.	
241524 -174.952 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0	20	.240310		0.	0.	0.	0.		0.	0.	
.294242609428E-01 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0	37	.241524		0.	0.	0.	0.		••	0.	
2997740 -1574194-01 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0	30	-274242		0.	0.	0.	0.		9.	٥.	
.297740 -179.971 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0	**	144445.		0.	0.	0.	0.		0.		
.294242600286E-01 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0	40	.297740		0.	0.	0.	0.		0.	•	
.295991171675E-01 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0	1+	.294242		0.	0.	0.	0.		0.	0.	
7 2.50021 -179.976 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0	4.	.295991		0.	9.	0.	0.		0.	0.	
7 2.20021 -179.975 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0	+	.2977+0		0.	0.	0.	0.		0.	0.	
7 .7455231447155-41 .0 .0 .0 .0 .0 .0 .0	(P3	7 4.20021		0.	0.	?	0.		0.	0.	
7 .9580781620775-02 .0 .0 .0 .0	183	7 .743523	1407136-01	٠.	9.	9.	0.		0.	0.	
	143	7 .958078	162077E-02	0.	0.	0.	0.		0.	?	



NUMBLE MOLEL WITH VONBIX AUGNENTON AND REMOTE FLUM SPLITTER USING EMPIRICAL COMBUSTION DATA

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*	MAKNING	1	PANAMETER	DPR	11	00000	13	4	DEFAULT	VALUE	
**	WANNING	1	PANAMETER	FAV	11	. 21000L-01	13	4	DEFAULT	VALUE	
*	WARNING	1	PANAMETER	JFUEL	"	-	15	4	DEFAULT	VALUE	
***	MARNING	1	PARAMETER	HOL	*	.15000	1	4	DEFAULT	VALUE	
*	WAKNING	•	PAKAMETER	Mon	**	. 28000	15	4	DEFAULT	VALUE	
**	MARNING	'	PANAME TER	OPO	11	. 64003E-01	13	4	DEFAULT	VALUE	
*	MAKNING	1	PANAMETER	OPS	**	0.	15	4	DEFAULT	VALUE	
*	WAKNING	1	PANAMETER	2	"	82.000	15	4	DEFAULT	VALUE	
**	WARNING	1	PAKAMETER	١ر	#	72.000	15	4	DEFAULT	VALUE	
*	MARNING	1	FANAME TER	5	"	14.000	?	4	DEFAULT	VALUE	
*	WARNING	'	PAKAMETER	77	"	36.000	15	4	DEFAULT	VALUE	
*	MAKNING	'	PAKAMETER	MoR	#	.22000	15	4	DEFAULT	VALUE	
**	MARNING	'	PANAMETER	NEANTR	#	3	1	•	CEFAULT	VALUE	
*	WAKNING	1	PAKAMETER	PRNUZ	"	4.4000	15	4	DEFAULT	VALUE	
**	MARNING	'	PAKAMETER	TCURE	11	. 50000E-02	15	4	DEFAULT	VALUE	
*	MARNING	'	PARAMETER	ОРН	"	.32000E-01	15	4	DEFAULT	VALUE	
:	WAKNING	'	PARAMETER	LB LB	"	000.00	15	4	DEFAULT	VALUE	
**	WAKNING	'	PAKAMETER	ב	11	5.0000	15	4	DEFAULT	VALUE	
*	MAKNING		PAKAMETER	160	"	700.00	1	4	DEFAULT	VALUE	
**	WARNING	1	PAKAMETER	LEFP	H	0.	15	4	DEFAULT	VALUE	
**	MAKNING	1	PAKAMETEK	ZcP	#	0.	13	4	DEFAULT	VALUE	

		, 11=	259 ,NAUGUP=					•	•	•			•			•	•			•	•			•			•	•			•	•	0.
		,LM= 14.000000	220000029	*************************	0.	0.	0.	٥.	0.	0.	0.	0.	•	0.	0.	0.	•	0.	0	0.	0.	•	•	•	0.	0.	0.	0.	•	0.	0.	0.	-01.ZEFP=
	840,00000	,LH= 14	971 , MOR=	JRE=	0.	•	•	•	•	•	•	•	•	•		•	•	•	0.	•	•	•	•	•	•	•	•		•	•	•	•	399999991L-01,2EFP=
	- 4 I 4	000000	179999471. =HOM.	4.3444462		0	?.	٥	•	•	0.	0	0.	0	0.	0.	0.	•		0	0.	0.	0	•	0.	0	0.	0.	0.	0	0.	0.	.7FF= -
					0	0.	0.	0.	0.	0.	0	0	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
	9 -> 90	0000000000	.14	O.PRNOZ=															1760.00000									•					
	es and the definition while	, Lb= 6	.MoC=	IR=	0.	0.	0.	•	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.		0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0
	9369	82.000000	36.0000000	Z,NPRNTR=															. ToH=														
	100	= 02.00	=27		0	0.		0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0	0.	0	0.	0.	0
	-100-10-22010000044	I LA=	30.0000000	1.NFSUF=	200 . 300000																												
2 211 114	ALUES	JFUEL=			,T6C= 700	0		0	0	0	0	0	0.	٥	0.	0.	0.	0	0	٠	0.	0.	٠.	0	00.	0	0.	0	0	0	0	0	0.
Transit To	EVORUIX	.210000015E-01, JFUEL=	5.00000000	2, NCUMUP =	00000000																												
1 1 1 1 1 1 1	EVOREIX	.210	5.00		7.00	•	0.	0.	0.	0.	0.	•		0.	0.		•	0.	?		0.	0.	•	0.	0.	0.	0.	•	•	0.	0.	0.	0.

THIS PROCKAM CHECKS SPECIFIC INPUTS TO ENSURE REASONABLE INPUT DATA.

IF THESE CHECKS ARE NOT SATISFIED THE JOB WILL BE TERMINATED.

VIOLATIONS, IF ANY, HILL BE PRINTED BELOW—

10047-6	1 NC = 305	20,40.00330	YEHA TO	18000.0000	2						
DIC= 1298.19360 LEND	#120p.	.292405069	- DIIC=		3245,48457	,TAUDC=	.171993417E-02				
END EEND EFANP	-TAKT	270766767.	-HI10, 27		2030.80640 ,1	, TAUDH=	.118351309E-02				
ZTFC= .536123349 GEND	,										
ECOKEP 21FH= .605063240 EEND	2										
L= 36.0000000 11.0000000 EEDD	, 36.0000000		16.00000000		000000000.		11.00000000	11.0000000	•	11.0000000	•
0,000000	36.00	. 0000000	72.0000000 146.000000		, 88.000000 154.000000	•	• 00000000.	104.000000	. 9	115.000000	Ī
15504.4609	, 29400.7422		, 15504.4009 51096.2754		21410,4805	, CH=	21410.4805	23661.6641		25731.4141	•
. 14994970 . 304113680 . END	1,331046641	. 146	.358112037	•	.358112097	. "I	.220000029	.249091804		.270939392	•
700.000000	, 2097.19	, 0000000	700.000000 3026.08530	•	1579.24561	. H.	1379.24501	1708.73340	•	2038.22144	•
PRHOT= .9100500090	96										
1.38972187	, 1.29092	8972187 ,	1.29289055	•	1.29289055	,6H=	1.34500408	1.52819748	•	1.31458378	•
6TAUF2019.05472E-02, TAUF293103280E-03, .77	.7709	.201905472E-02, \$1353E-03, .14	07		.03, .191418527E-03, .0	27E-03, ,IAUFH≃	.394577626E-03,		.352251576E-03,	, .319539802k-03	2r-(
1AUG= .273166131E-62, .561896807E-03, .55	.2513	.2/3166131E-02, 15956E-03, .300	3	1	02, .299397856E-U3,	56E-U3,	.633584335E-05. = .805446412E-03		.000548461E-03,	, .>77728963E-03	3E-0
TAUE: .154794157E-U1, .122958070E-02, .10	.1000	.154794157E-01,	83	4	.02, .106150191E-02,	91E-02, ,TAUEH≃	.209409720E-02. = .207114846E-02		.170517699E-02,	143086701E-02	1E-0
00000 00000 455.674072	. 472.110	10.552	472.110352		···	•	398.798096	, 418.475580	980	437.618164	

NUMBER MUDEL WITH VENEIX AUGMENTEN AND REMOTE FLOW SPLITTEN USING EMPIRICAL COMBUSTION DATA

I CASE 8	KUMOLE VOR	* TEN	REMOTE *EMPERICAL * OF **	FREUITNOY =	CASE HERTZ	FREDUENCY	= 10.00 HERTZ	FREDUENCY	= 15.00 HERTZ
-	-	LA IN	DHACE ANGLE	N 4.	PHANT ANGLE	CAIN	THE AND THE	GAIN	PHANE ANGLE
2		713.5	TASE ANGLE	201127	-28.775	18484	45.10.36	171634	-57.3577
		117777	00000	0.7077	201 724	25.123.1	-205 164	46.534	800
	,	4001000	000.001	070000	611.007	. 70 70 1	1011077	121546	253. 537
-	7	114767	1200.000	217077.	7611.07-	01010	1939	* 601110	1100016-
7	,	.240100	1000-000-	900067.	144.5440	006/47.	-30.3414	+ 4 + 4 7 7 .	64/1-44-
7	2	.700833	-180.000	.673033	-200-553	117575.	-208.875	414846.	-213.309
2	0	201040.	-300.000	· 288+02	-30.0092	.223345	-+7.8581	.182145	-58.3238
17	1	001040.	-200.000	07447.0	-41.7415	.243510	130.3454	.220422	-55.7500
2	۵	.708033	-180.000	.607062	-191.005	.617320	-191.108	.626663	-188.994
3	,	.340100	-300.000	.207394	-35.0942	.165692	1164.06-	.11414	-40.7323
Sn	10	.340100	-360.000	. 274720	-21.7213	.243516	-30.9454	.220422	-35.7500
311	11	.872+34E-01		.113125	-100.970	.148934	-100.004	.184811	-104.302
3H	12	.340100	-300.000	107+62.	-22.7+44	.243398	-33.0157	.220082	-38.9064
	1.	.240100	-366.000	1175673.	-22.1005	.245024	-31.9020	.42322+	-37.3526
77	1,4	.67454E-01		.103536	-107.005	.129720	-107.948	.150502	-173.284
2H	15	.340163	-360.000	117557	-22.1605	+205+7.	-51.9020	.223624	-37.3526
N.	0,	1.00000	-360.000	1.00000	-360.000	1.00000	-300.000	1.00000	-360.000
3	17	.428672	-180.000	.457723	-176.974	.501427	-178.660	.534487	-182.549
311	18	1252417	-360.000	. 2453425	-42.4575	.194263	-70.7420	.188150	-92.0342
100	1.9	.129431E-U	0	.0910926-01		.105735	-1+0.751	.129362	-151.610
4	200	.362050	-300.000-	. 215,000	-20.4333	+16707.	-28.5663	.240082	-32.5709
,	7.7	4.236095	-160.000	7+44657.	-179.007	944047.	-175.830	.280103	-175.707
,	77	.238695	-366.000	1757541.	-30.4637	105551.	0860***-	.121049	-46.6525
0	2.5	302050	-260.000	.314305	-14.6423	.259860	-20.8805	.234720	-29.7473
2	5+	.238095	-180.000	*520094	-171.219	.285173	-105.247	.33797+	-165.770
2	57	.238075	-300.000	.190235	-27.9883	.129683	-35.0890	.100052	-29.0595
0	0.7	.257623		.308122	-20.0342	.252534	-27.2551	.220095	-24.0002
0	177		1 -160.000	.2262546-01	1 -125.205	-9647759E-	-01 -111.045	.105285	-141.944
0	28	.210487L-01		.128206	-122.469	.176073	-150.520	.187221	-164.826
1	5.4	.350776	-360.000	.301247	-20.4596	.244618	-27.0581	.218129	-29.8338
1	20	.112021	260.000	.130506	-6.74055	.146013	-25.5764	.150445	-45.5651
7	51	.113503	-190.000	.242870	-152.694	.321710	-100.820	.347203	-177.322
0	34	.342681	-366.000	. 493550	-20.9460	.235859	-26.1199	.208726	1408.67-
0		.204869	-360.000	+52677.	-3.75,06	.248934	-16.1975	*02057*	-30.0993
D	3+	.200540	-100.001-	195666.	-101.522	.425829	-173.120	.458330	-163.310
6	35	335445	-260.000	. 284763	-21.5110	.225949	-28.6773	141961.	1206.67-
	30	.27+102	-300.000	.303885	-3.22068	.327710	-14. (441	.331693	-26.4725
5	27	.270246	-160.000	\$400905	-105.912	.504043	-177.100	541055·	-187.032
10	רמ	.325852	100.000-	74511	-24.2163	. 14400	-29.3854	.185691	-29.4768
10	40	.368567	-360.000	.362494	-3.22813	.390338	-14.2242	+56065.	-25.8817
10	7.7	.351800	-180.000	.404381	-108.775	.566490	-180.098	179909.	-191.11>
11	1+	.325856	-360.000	.276841	-24.7654	.216588	-31.6550	.187949	-34.7588
V11	+2	.328827	-360,000	268ccc.	-5.52281	.381809	-17.1603	.393359	-24.3456
	7+	.331600	-180.000	*+8+5+*	-175.129	.55+690	-191.500	.599868	-207.652
	1 CA/0	4.46621	-180.000	2.33100	-109.343	2.53502	-100.103	2.85218	-153.244
	1/13 7	.743563	0.	.747.393	-7.05369	.759059	-14.2182	170001	-21.0070
	1/Ps 7	.957935	0.	. 434314	-1.04401	.897632	709610	.852679	-329.009

RUMBLE MUDEL WITH VUNDIA AUGMENTUR AND REMUTE FLUM SPLITTER USING EMPIRICAL CUMBUSTION DATA

MANE   MALE	CA3E 0	משפרט	FREQUENCY	= 20.00 HERIZ FRESUENCY =	FAE JUENCY =	25.00 HERTZ	FREQUENCY	= 30.00 HEKTZ	FREQUENCY :	= 35.00 HERTZ
1	PARAMTER	10	CAIN	PHASE ANGLE	CAIN	PHASE ANGLE	CAIN	PHASE ANGLE	GAIN	PHASE ANGLE
2 (1988)	10		.108884	-69.9473	.171000	-84.4801	.181958	1724.46-	.204926	-109.660
12,000   1,0	11	2	.455.24	1-249.547	*+0101+	-202.480	.490362	-274.927	.55756+	-289.000
1,000,000	21	7	.105054	-104.7475	.171306	-82.4801	.161958	-94.9277	.20+928	-109.000
10   10   10   10   10   10   10   10	55	,	119477	->2.3249	944977.	-00.3794	.239258	-68.3144	.267410	-18.4034
10.0001	12	٨	\$5*645.	-416.670	212064.	-224.401	166559.	-230.562	.77 302t	424.457
10   10   10   10   10   10   10   10	42	0	134726	-64.0370	133906	-04.6504	.143691	-00.9014	.182772	-02.7404
10	53	1	.209443	4709.04-	.203149	6216.44-	.205509	-48.5413	.219199	-53.0801
133-64	13	0	.683060	-189.484	.700702	-191.163	.880758	-194.210	1.00051	-200.412
10	53	,	100561.	-460.004	.107304	-37.790+	.170+00	-55.7008	.140940	-72.9882
1.	HEG	10	.209443	-40.0025	.205149	44.9179	604407	-48.5413	.219199	-53.0801
2   200068	13H	11	045615.	-171.510	.248001	-179.052	.282322	-186.230	.329411	-195.101
13   131000	33H	12	.208689	-44.8807	.201723	-50.3657	.203033	-55.1763	.215056	-61.5184
1	PZH	13	.213666	-42.5954	. 205769	-46.2344	.212606	-52.9154	.227996	-59.2142
1	HZH	1,4		-181.80>	.411367	-150.695	.241138	-199.731	.282716	-210.347
10   10   10   10   10   10   10   10	KZH KZH	12	.213000	-42.5454	401005.	-40.2394	.212606	-52.9154	0661777	-59.2142
17   1998/06   184-012   1991/26   120-199   175040   135-35-3   13991/4   13991/4   110-70-3   110-90-90   110-	NIC	10	1.00000	-300.000	1.00000	-300.000	1.00000	-360.000	1.00000	-300.000
18	13	17	.558706	-184.012	.615174	-104.134	.757640	-185,333	.984145	-173.002
1	13H	18	.191978	-110.783	199126	-126.796	.213621	-140.443	.238903	-134.404
20	Tuo	1.1	.150090	-159.051	.170499	-104.520	.218080	-171.191	.275856	-162.446
21	*	50	.231429	-36.7463	.227051	T56c.04-	.253421	-43.4174	.254046	-48.2364
22	4	51	1.328557	-179.412	.371953	-184.332	.428176	-189.680	.507164	-197.439
23 .221902	+	22	614121.	49.2523	.131000	-58.6502	.130904	-73.6487	.131094	-92.0300
24	5	23	204122*	-32.5344	0714170	7015.46-	.216403	-35.5740	.232043	-28.1762
25 .106736 -27.0056 .989147E-U1 -32.5482 .732096E-D1 -22.9312 .710143E-O1 .205739 .227084 .227084 .225744 .205733 .227084 .225744 .205739 .255743 .227084 .225743 .226598 .226743 .226744 .226743 .226744 .226743 .226744 .226743 .226744 .226743 .226744 .226743 .226744 .226743 .226744 .226743 .226744 .226743 .226744 .226743 .226744 .226743 .226744 .226743 .226744 .226743 .226744 .226743 .226744 .226743 .226744 .226743 .226744 .226743 .226744 .226743 .226744 .226743 .226744 .226	5	5+	.395246	-100.005	451115	-109.484	.520346	-175.143	.16710.	-179.015
26	5	52	.106736	-27.0656	LL		LLI		ш	
27 1496990 -133.747 -169981 -145.346 -152.339 -310299 -110.246939 -111.394 -111.394 -111.346 -110.041 -12.336 -110.045 -110.046 -131.046 -	9	50	.213459	-32-1244	.205733	-33.4270	.205158	-33.7148	.227084	-35.8310
28	2	27	.149090	-133.747	.169981	-143.346	.243302	-152.339	.310299	-164.265
29 .204598 -31.6c70 .197176 -36.1767 .2021391.0046 .22691 30 .151929 -64.4413 .159810 -86.0905 .179506 -103.042 .209433 .195191 -29.3672 .196.044 .28791 .197980 -196.049 .196.044 .28791 .29.3672 .218316 .194995 -31.0356 .196110 -30.7213 .195011 -29.3672 .218316 .24.971 .29.372 .246623 .77.6486 .24.993 .24.991 .29.4971 .27.6486 .24.3672 .218316 .24.991 .187450 -190.771 .528.23 .75.6486 .20.0819 .283399 .44.2670 .36.5047 .26.3494 .357535 -64.2869 .317074 .26.3494 .357535 -64.2869 .317074 .26.3494 .357535 -64.2869 .317074 .26.3494 .357535 -64.2869 .317074 .26.3294 .46.2594 .397801 .357535 .23.3339 .218450 .20.3494 .397801 .357535 .23.3334 .23.3334 .23.3334 .23.3334 .26.2234 .26.2544 .397801 .397802 .46.2544 .26.2544 .397802 .419031 .33.2021 .16.337 .46.2543 .20.3182 .30.3182 .20.3182 .30.3182	9	97	.194339	-171.394	.212087	-177.011	.243454	-187.483	.255743	-203.328
30	1	52	•504290	-31.6270	.157176	-34.1707	.202139	-51.0040	160777.	-33.3847
31	1	30	1151424	-64.4413	018641.	-84.6905	.179506	-103.044	.209435	-127.318
32	1.1	31	.363201	-163.775	. 391 928	-190.058	.428759	-196.634	+98136+	-211.011
33 .240401 -43.6179 .244971 -57.3062 .246623 -77.6486 .24.5993 .474460 -194.771 .51226 -197.775 .554686 -200.819 .583999 .4747650 -194.771 .52623 -75.6486 .22.7173 .214266 .26.4280 .214266 .26.4280 .214266 .26.5473 .214266 .26.4280 .217074 .26.5401 .187459 -64.2805 .217074 .26.5401 .187459 -64.2805 .217074 .26.5401 .26.5401 .57931 .213.421 .68182 .23.5394 .209712 .26.5401 .398802 -197.974 .26.5254 .398801 .21.2401 .759312 .23.5394 .209712 .26.5277 .398809 .41290 .412820 .41290 .41	9	32	.194595	-31.0356	.100110	-30.7213	110541.	-24.3672	.218516	-30.7841
34	00	33	.240401	-43.8179	126447.	-57.3062	.246023	-73.6486	.245645.	-74.5608
35 .184.275 -30.3221 .178185 -20.9301 .187459 -20.7173 .214260 .327912	9	34	094624.	-150.771	.512 ?26	-197.775	.55+000	-200.819	. >83959	-418.564
36 .325012 -36.5047 .328231 -50.3498 .327535 -64.2865 .317014 .3255802 -19.3491 .327535 -64.2865 .317014 .3255802 -19.3421 .681825 .203.815 .247732 -213.421 .681825 .32 .33 .33 .355802 -24.3444 .179183 -23.5354 .23.5354 .398051 -36.4277 .398294 -45.2554 .398805 -61.2401 .388055 .41 .36837 -20.4172 .208.893 .721493 -219.100 .759315 .35.43545 -26.7045 .153421 -36.4074 .149031 -33.2021 .161377 .42 .42 .42 .42 .42 .42 .42 .42 .42 .42	6	35	.184275	-30.3221	.178169	-28.9801	.187459	-20.1173	.214200	-21.9373
. 57 .565802 -1929914 .602235 -203.816 .647732 -213.421 .681825 .558802 -1929914 .166962 -26.5016 .23.5034 .209712 .35.0304 .396801 -26.5017 .396801 -36.5017 .396804 .396801 -36.5017 .396804 .396805 .712493 .200712 .3869294 .4622554 .396805 .712493 .212401 .759315 .412401 .759315 .300010 .4000010 .4000010 .4000010 .4000010 .4000010 .4000010 .4000010 .4000010 .4000010 .4000010 .4000010 .4000010 .4000010 .4000010 .400001	61	36	325017	-38.5047	162826.	-50.3498	.327535	-64.2805	.517074	-81.2949
36 .171945 -29.4267 .106962 -26.5044 .179163 -23.5354 .209712 .3998891 -36.4277 .398894 -46.2554 .298650 -61.2401 .3988050 -61.2401 .3988050 -61.2401 .3988050 -61.2401 .3988050 -61.2401 .3988050 -61.2401 .3988050 -61.2401 .308055 -20.4031 -30.4031 -33.2021 .161377 -61.2401 -40.7045 -41.7921 -31.8107 -44.2497 -64.1299 .405645 -42.287 -64.1299 .405645 -42.2857 -22.1299 -42.2857 -24.9410 .35.26152 -140.245 -140.245 -140.245 -140.245 -42.2857 -40.388402 -40.3884		37	708495.	-195.914	.602235	-203.816	.647732	-215.421	.681825	-265.543
39 .396801 -36.4277 .398294 -46.2554 .398650 -61.2401 .388055 .72843 .72	10	26	.171945	-24.4287	.106962	-26.50.44	.179183	-23.5354	217602.	-24.0999
40 .634545 -200.172 .673278 -200.693 .721493 -219.100 .759515 .760614 .168637 -36.4026 .155421 -36.704 .149031 -33.2021 .161377 .405010 -40.7045 .41721 -51.8107 .442297 -64.1299 .465645 .25855 -221.712 .6684907 -2.55.14 .760614 -249.410 .83.1754 .1760614 -249.410 .45.669 .456545 .1765.69 .456545 .1765.69 .456546 .45.669 .456546 .45.66541 -245.669 .456546 .45.66541 -245.669 .456546 .45.669 .456546 .45.669 .45.66	110	39	.390801	-36.4277	*39859*	-46.2554	059865.	-61.2401	c4088c.	-76.4553
41 .108037 -36.9026 .153421 -36.4031 -33.2021 .101377 .4.2021 .101377 .4.2021 .4.2021 .101377 .4.2021 .4.2021 .4.2031 .2.2021 .101377 .4.2021 .4.2021 .4.20243 .4.20243 .4.20243 .4.20243 .4.20243 .4.20242 .4.202	810	40	.634345	-200.172	.6/3278	-208.893	.721493	-219.100	.759315	-231.371
42 .402010 -40.7045 .417921 -51.8107 .442297 -64.1299 .465645 43 .635852 -221.712 .658907 -235.144 .760614 -249.910 .831754 8/P3 7 3.26152 -145.650 3.74455 -140.245 4.28573 -145.659 4.86546 1/P5 7 .806541 -24.3445 .542362 -37.5622 .885402 -66.3864 .934699	111	+1	100001.	-36.9036	.153421	-30.0724	.149031	-33.2021	.161377	-30.6150
43 .035852 -221.712 .058907 -2.55.144 .760614 -249.910 .831754 .8573 -145.609 4.86546 .456545 -145.609 4.86546 .934890 -145.509 4.86546 .934890 .934890 .934890 .934890 .934890 .934890 .934890	V11	74	.402010	-40.104-	176214.	-51.8107	167744.	-64.1299	.40504.	-76.5171
8/F3 7 3.20132 -146.650 3.74435 -140.245 4.28573 -145.609 4.86546 1/F3 7 3.80541 -24.3445 3.645052 3.745522 383402 -46.3864 3.34590	811	43	*035852	-221.712	.668907	-235.144	.76061+	-249.910	.831754	-266.794
OASTA - 1980 011 201088 2796151 207178 115088 1 15088 1 15088	5.5	8/73	7 5.26152	-146.650	3.74455	-140.245	4.28573	-145.609	4.80540	-146.732
		17.50	1+5005+1	-63.3443	200749.	-31.3622	704588*	140.3864	.454840	-55.4803

RUMBLE MODEL WITH VONBIX AUGMENTOR AND REMUTE FLOW SPLITTER USING EMPIRICAL COMBUSTION DATA

בר ב										
##### 10 No.		KUMOLe	VUNUIX*REMUI	E #EMFERICAL#UP#1	*I ABEPLOT *TES	1 CASE 45.30 HERIV	FREDUENCY =	SOLUGI HERIZ	FREDUÊNCY	= 55-60 HFR12
1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1,	RAMI	0	GAIN	PHASE ANGLE	GAIN	PHASE ANGLE	GAIN	PHASE ANGLE	GAIN	PHASE ANGLE
2			210405.	-140.710	. 27830	-150.05	.275486	-173.585	291112	-147.062
100.0001	11	2	.031453	-306-770	2+8+60.	-350.691	.742418	-333.545	. 784523	-17.6541
100.020	11	9	.234013	-128.77	. 237830	-150.892	.275485	-173.565	211162.	-197.062
7.100309 -77.08.2   1.00309 -77.08.2   1.00309 -77.08.2   1.23.2.2   1.23.2.3	2	1	.303174	-94.9155	67 505 5.	-110.520	.347814	-128.219	.365992	-147.439
1, 2, 4, 6, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2,	2	2	700+76·	-253.221	1.00309	-470.305	1.18417	644.987-	1.30094	-308.244
1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1,		0	.244622	-13.2282	908908.	-95.393+	.354477	-118.774	.38+392	-144.715
11. 12.27.19 11. 12.27.29 11. 12.27.29 11. 12.27.29 11. 12.27.29 11. 12.27.29 11. 12.27.29 11. 12.27.29 11. 12.27.29 12. 12.20.07 12. 12.20.07 12. 12.20.07 13. 12.27.29 13. 12.27.29 14. 12.27.29 15. 12.27.29 16. 12.27.29 17. 12.27.29 18. 12.27.29 19. 1	6	1	0471670	-01.52.00	143647	-73.0828	.254833	-83.5820	.202791	-94.8862
10	3	۵	1.25415	-411.593	1.49223	-240.174	1.65042	-241.535	1.78487	-458.573
11	.3	,	34074C6.	-01 -00.4420	.145343	-39.8474	.250265	-58.7269	.310039	-91.1365
11	LS.	10	.237240	-62.5280	1+7947.	-73.0628	.254833	-83.3820	.262791	-94.8882
12	27	11	.381185	-207.044	.417372	-262.468	. +38+78	-230.973	*452154	-252.091
13	Ch.	12	.233078	-71.3023	.230000	-83.2805	.241776	6898 - +6-	.245594	-107-199
1	H	1.5	.247058	-09.1017	. 57575	-61.1520	.265719	-92.9124	.272680	-105.405
15	717	1+	493475.	161.422-	016+00.	-241.495	.388700	-258.224	407395	-275.740
1.000,00c	H7	15	.247056	-09.107;	676862.	-61.1526	.265719	-92.9124	0897277	-105.405
1.21710	N	16	1.00000	-300.000	1.00000	-300.000	1.00000	-360.000	1.00000	-300.000
19	3	17	1.21710	-205.025	1.34787	-426.852	1.40049	-242.036	1.48409	-255.725
19	3н	10	.20741+	-171.015	.283051	-184.052	.288834	-206.022	.288263	-222.741
20	100	15	110000.	-196.977	664500.	-217.109	.379377	-232.933	.39874+	-247.751
21 .004457	,	07	1.280727	-20.9572	. 498724	-00-1100	.510234	-77.3192	.325003	-91.2301
22		7.7	7645000	-<04.460	464+10.	-254.575	.725387	-439.227	.164772	-255.140
25		24	*K.8501.	-104.305	.837270E-C	1 -114.001	.918140E-0	1 -112.934	.110060	-131.459
24	•	55	.255556	-44.5363	.202020	-53.2620	.278146	-01.9042	.290597	-71.0285
25 - 1575.6	0	7+	5727275	-188.931	.803844	-201.469	.361280	-213.813	*02468.	-226.697
28	0	57	137535	-345.655	.205+20	-2.40001	.238315	-19.8549	.259779	-30.7035
28	0	07	147167.	-42.1004	.207443	-20.7925	.274709	-59.2730	.295+57	-08.9769
28	٥	17	154565.	-100.444	261664.	-197.907	.501864	-214.004	.547209	140.067-
27 . 247246 - 194.6894 . 201440 - 48.4188 . 201459 . 240359 - 154.649 . 261340 - 160.491 . 261340 . 240359 - 124.649 . 261340 . 261340 - 253.648 . 247646 . 277.2293 . 261269140.671 . 253.648 . 247646117.889 261262140.641 . 241.691 . 240.642140.641241.691241.691241.691241.691241.691241.691241.691241.691241.691241.691241.691241.691241.691241.691241.691241.692241.	0	28	.229403	-221.599	.170076	-253.578	.126+56	-232.943	-975725E-	01 -235.911
50	1	5.4	907447.	-54.6834	.267440	-48.4189	.282003	-50.0047	.300820	-66.5000
31	1	20	.240359	-154.649	.263130	-180.991	.280192	-203.673	.323677	-225.670
24	1	31	433209	-264.424	.362507	-255.648	.349303	-238.270	.322614	-245.670
24	9	35	040147.	-57.2445	.201080	-40.0711	.28+524	-54.4170	.300+00	-64.2995
34 . 241.091 35 . 240064 . 34.0574 . 250890 . 43.0708 36 . 240064 . 34.0574 . 207890 . 43.0700 37 . 240064 . 240.021 . 240.021 38 . 240.024 . 248.214 . 241.74 . 248.034 38 . 240.02 . 240.021 . 207704 . 410.792 39 . 250.034 . 240.021 . 250.035 . 40.0308 41 . 180.024 . 240.021 . 240.031 . 340.032 41 . 250.002 . 250.032 . 108.031 41 . 250.032 . 250.032 41 . 250.032 . 250.032 41 . 240.031 . 250.032	2	20	C11877.	-119.809	670707	-140.041-	.100001	-175.943	.191749	-205.032
25 .246064 -34.0574 .207850 -43.0709 30 .286262 -100.592 .246100 -111.579 31 .077062 -126.214 .261704 -41.1502 32 .24425 -51.0517 .261704 -41.1502 34 .070196 -244.521 .209402 -107.925 40 .760196 -244.521 .209402 -107.925 41 .182041 -94.170 .461990 -108.512 42 .472169 -284.704 .461990 -108.309 41 .26271 -292021 -293.010 .401802 -77.48037	0	34	755575.	-631.350	186055.	-241.091	.504701	-247.925	.481790	-257.025
37 .286.662 .100.592 .2416.00 .119.579 37 .677637 .238.214 .64174 .248.634 38 .284.637 .208.214 .641974 .248.634 39 .286.493 .941.632 .107.923 40 .786.196 .784.521 .709.25 .300.632 41 .472.197 .248.704 .461990 .108.213 42 .472.197 .284.704 .461990 .153.089 41 .472.197 .284.704 .286.777 .267.637		35	490947.	-34.0574	.207850	-43.6700	.287025	-52,0414	.311908	-62.1212
37 .677637 -248.214 .619474 -248.634 .248.634 .268.634 .268.634 .268.634 .268.634 .268.634 .268.634 .268.634 .268.634 .268.634 .268.634 .268.634 .268.634 .107.642 .269.657 .260.642 .168.612 .268.644 .268.644 .268.644 .268.644 .268.644 .268.672 .268.644 .2	5	20	.286,62	-100.092	.241606	-119.579	.232824	-134.455	.100021	-100.189
26 - 24-25-2 - 21.050-1		37	100770.	-438.214	+261+0.	-240.034	.021728	-230.868	.603061	-267.105
40 - 107.925 - 24.627 - 209462 - 107.925 - 295.573 - 29.627 - 107.925 - 24.621 - 107.925 - 29.6573 - 29.6957 - 29.69	20	20	.24423	7100.16-	+01107.	-41.1302	.2892+1	24.0745	.317073	-59.9341
41 .183021 -244.521 .704.52 -255.573 .704.52 -255.573 .704.521 .704.521 .704.521 .704.521 .704.521 .704.521 .704.521 .704.521 .704.501 .704.501 .704.501 .704.501 .704.501 .704.501 .705.501 .70	10	55	£8466c.	-92.5320	2046000	-107.925	.267984	-122.900	.219785	-1+1.312
42 .183021 -184541 . 645464	10	10	.760196	-244.541	.750455	-255.573	.115713	-264.844	.701459	-275.939
45 472.05	11	17	.183021	-33.3453	4566841.	-39.25+8	.21+778	-44.5045	.238650	-51.5237
45	11	75	.472164	-74.1710	040104.	-108.515	.458069	-121.459	.457428	-130.031
1/75 / 1/50.02 - 1/50.03 - 1/50.089 - 1/50.089 - 1/50.089 - 1/75 / 1/50.037 -		100	4066000	-284.704	.673220	-300.005	.895722	-315.001	.923133	-330.944
7.11434 -151.016 . 803775 -17.5087		5/P3	30404.6 1	-149.204	0.01105	-153.089	0.47040	-157.952	0.79197	-165.485
1 .771434 -151.016 .803775 -320.172	1	1/20	0.0108.	100.44.001	1.03862	-77.6301	1.08105	4700.04-	1.10777	-104.774
	11	1/23	1 .771434	-231.016	. 303775	-320.172	.842390	-526.0355	.908138	-316.035

RUMBLE MODEL WITH VURBIX AUGMENTUN'AND REMOTE FLUM SPLITIER USING EMPIRICAL COMBUSTION DATA

I CASE 8	I CASE & KUMBLE VOKBIX*	REMUTE UENCY	*cMPERICAL*JP4*TABEPLUI*TEST = 60.00 HEXIZ FREQUENCY = 4	TABEPLUI+TES FREQUENCY =	1 CASE 65.00 HERTZ	FREQUENCY =	70.00 HERTZ	FREQUENCY =	75.00 HEK 14
PARAMTER I	ID NO.	GAIN	PHASE ANGLE	GAIN	PHASE ANGLE	GAIN	PHASE ANGLE	GAIN	
PI	-	171545.	-223.410	114472.	-247.404	.269553		.268321	-290.876
11	2	780087.	-43.4101	.754498	-67.4636	.726424	-87.0126	.723103	-110.676
RI	3	.293177	-223.410	174472.	-247.404	.269553	-269.012	.268321	-290.876
P2	*	.304402	-108.204	.345028	-187.208	.324035	-203.020	.324622	-220.276
42	5	1.35779	-329.934	1.33915	-350.172	1.32679	-8.09560	1.35407	-26.4990
RZ	٥	0,576090	-172.323	.330286	-197.170	201772.	-216.933	.23.5649	-232.278
P3	1	.263140	-107.039	.254403	-118,948	.251698	-126.343	.259685	-138.857
V3	۵	1.82021	-276.702	1.74434	-243.376	1.67150	-307.219	1.64519	-321.059
R3	,	206612.	-125.650	.180097	-149.560	.111647	-136.246	.164034	-124.687
РЗН	10	.263140	-107.039	.254463	-116.948	.251698	-128.343	.259083	-138.857
N3H	11	.442839	-200.01.	.411500	-281.404	.387205	-291.746	.379458	-301.843
R3H	17	.241967	-120.055	.230102	-132.966	.223804	-143.090	.227039	-154.288
PZH	13	102175.	-119.151	10+097.	-151.245	.256109	-141.230	.263341	-152.205
V2H	1,4	.405498	-294.555	.383540	-311,281	.365591	-325.202	.360689	-339.440
82H	15	.271201	-115.151	.260407	-151.243	.256109	-141.230	.265341	-152.205
NIC	10	1.00000	-360.000	1.00000	-300,000	1.00000	-360.000	1.00000	-360.000
N3	17	1.58119	-271.678	1.00250	-284.572	1.56133	-306.576	1.48653	-322.839
13H	16	.275169	-239.662-	.240006	-252.297	.228015	-261.056	.223881	-208.890
1000	19	.414320	-264.679	+5690+	-282.116	.386323	-298.015	.362633	-212.678
<b>5</b> 4	50	.325325	-104.670	.315458	-110.844	.310060	-127.095	512716.	-138.165
1,4	21	.764223	-272.290	.720810	-287.438	.682586	-244.687	+600000	-311.788
*	22	.103447	-163.439	.071606E-U	1 -197,641	.205861E-0	_	.230088E-01	•
5	23	.244831	-83.3007	.280800	6+60.+6-	.281883	-103.245	.285372	-113.334
15	54	164468.	-240.352	.84032	-251.624	.812844	-259.800	.814022	-208.047
51	55	.308717	1866.04-	.307,356	-57.6031	*06504*	-77.4169	.412072	-97.4269
96	20	.302042	-80.89+2	.293983	-91.8125	.288432	-100.004	1295027	-109.969
9	2.1	.566770	-247-124	177186.	-261.304	.544343	-271.122	.509645	-219.905
86	58	-326850E-	.01 -221.780	.954733E-0	_	-20807+	-146.860	.298874	-166.033
1	5.4	.30430+	-76.7310	.300860	-89.6879	.295128	-97.9865	.301616	-106.640
11	30	.346280	-246.205	.343507	-200.387	.340099	-277.817	.379+0+	-280.834
11	21	.251989	-451.288	.194305	-254.735	.254084	-216.207	1925565	-419.151
8	32	194010.	-76.7360	.307554	-67.6540	.302142	-95.4107	116116.	-105.376
18	53	.194280	-237.616	.187588	-203.484	.191003	-277.442	0155270	-200.040
82	34	.410306	-265.166	.339530	-260.955	.365271	-251.033	140154.	-251.918
60	35	.323324	-74-8467	.313836	-85.0838	.309221		.322954	-100.227
6/	30	.121052	-200.032	.845930E-0	_	.790234E-01		.110245	-265.918
80	37	961555.	-476.071	.458495	-277.110	.471484	-272.491	.547358	-274.617
010	38	.324560	-72.9817	014616.	-45.7132			.134513	-97.1449
V10	39	.153%62	-158.671	.104355	-105.246	.938184E-0	Ŀ	0-366666°	i
410	10	1054501	-286.530	198655.	-284.586	.567603	-288.296	.038978	-291.950
111	1+1	.255257	-62.4902	.250366	-72.6124	.241368	-78.1887	.247826	-81.6982
117	74	4+147+	-150.58+	. 395193	-159.705	.401953	-105.920	.442875	-175.805
KIII	640	306/205	-341.245	.817171	-357.565	.830338	-2.84942	.930731	-11.1072
200	8/7	7 0.91827	-169.145	66458.0	-174.428	0.64088	-178.870	0.33333	-182.203
1	1/23		-115.77	1.1002+	-126.515	1.07094	-140.670	1.03326	-152.050
F11	1/73	. 4 10020	-314.852	. 483844	-313.004	.960943	-304.846	.954334	-302.842

RUMBLE MUDEL ALTH VUNGIA AUGMENTUR AND NEMUTE FLUM SPLITTER USING EMPIRICAL COMBUSTION DATA

RUMBLE													
1 CASE	20	AUMORE V	VOXULX #XEMULE	EMPERICAL* JP	11	CASE							
DASAMI	-	7	TREE DENCY	PHACE AND TE	TREADENCE	0.00	ANG F	GAIN	0.0	ANGIT	TACCOUNCE IN	0.0	ANGLE
P.1	-		207390	-314.730	0.		11011	0	100				11000
			721136	-134.736		2 3		0.	0		0.		
	. ~		247.40	200									
1 0	2		251155	23. 130									
,,,	* 4		1 .70.5	230.838									
7.0	n .		1.51965	+010.14									
24	0 1		010002	C+K+7+7-									
2	-		0+7607.	-152-189		2		2.			•	•	
×3	00		1.01472	-330.467	0.	0.		0.	0.		0.	•	
R3	5		.240623	-147.471	0.	?		0.	0.		0.	?	
РЗН	10		.269248	-152.189	0.	0.		0.	0.		0.	•	
VSH	11		.375920	-313.028	0.	0.		0.	0.		0.		
R3H	12		.231375	-168.274	?.	0.		0.	0.		0.	0.	
PZH	13		.272817	-165.933	0.	0.		0.	0.		0.	°	
V2H	14		.356740	-355.507	0.			0.	0.		0.	0.	
RZH	15		118717	-165.935	0.	0.		0.	0.		0.	9	
NIO	16		1.00000	-360.000	0.	0.		0.	0.		0.	0	
M.S	17		1.39725	-357.905	0.	0.		0.	0.		0.	0.	
HOM	18		.227+70	-278.291	9.	0.		0.	0.		0.	0.	
1000	17		.339180	-320.106	0.	0.		0.	0.		0.	9.	
*4	70		.345160	-151-040	?.	2.		0.	0.		0.	0.	
**	21		\$10000.	-525.571	0.	0.		0.			0.	0.	
84	77		6543E	-01 -136.545	0.	0.		0.	0.		0.	0.	
65	63		.280203	-145.836	0.	0.		٥.	0.		0.		
45	57		.827664	-278.044	0.	0.		0.	0.		0.	0.	
35	25		.400705	-115.414	0.	٥.		0.	0.		0.	•	
94	97		962862.	-121.759	0.	0.		0.	0.		0.	•	
Ve	17		.613524	-290.062	0.	2.		0.	0.		0.	0.	
86	58		+35856.	-164.099	0.	0.		0.	0.		0.	•	
14	57		.310624	-117.750	0.	٥.		0.	٥.		0.	•	
17	30		.+35339	-297.856	0.	٥.		0.	0.		0.	•	
R7	31		.431216	-228.939	0.	0.		0.	0.		0.	•	
Pa	35		.325266.	-115.950	0.	٥.		0.	?		0.	•	
0 4	33		.28+368	-298.715	0.	0.		0.	0.		0.	?	
Ro	+ 1		.524173	-259.806	0.	0.		0.	0.		0.	?	
5.4	55		.341754	-110.450	٥.	0.		?.			0.	•	
64	30		.164050	-286.117	0.	0.		٥.	0.		9.	0.	
68	37		.010941	-282.010	0.	0.		0.	0.		0.	0.	
P10	20		454456.	-107.125	0.	0.		. 0.	0.		0.	0.	
V10	39		.113161	-241.297	,.	0.		0.	0.		0.	?	
RIC	10		.707110	-300.593	0.	0.		0.	0.		0.	0.	
P111	41		.203980	-67.6208	0.	0.		0.	0.		0.	0.	
V11	74		485306	-189.670	0.	٠.		0.	0.		0.	0.	
K11	43		1.05523	-43.9435	0.	0.		0,	0.		0.	3.	
V3	0/13		3 2.44715	-164.297	0.	0.		0.	0.		0.	0.	
P1	1/13			-162.346	0.	٥.		0.	?.		0.	•	
P11	+1/P3		86.	-294.831	0.	0.		0.	0.		0.	0	

RUMBLE MUDEL WITH VORSEX AUGMENTUR AND REMUTE FLUM SPLITTER USING EMPIRICAL COMBUSTION DATA

FRE FRE	1	FREDURACY	= 40.00 AEKIL FREQUENCY =100.00	FREQUENCY	=100.00 HERTE	FREQUENCY	=110.00 HERTZ	PREQUENCY =1	=120.00 HERT2
PARAMTER 10 NO	10 NO.	GAIN	PHASE ANGLE		PHASE ANGLE		PHASE ANGLE	GAIN	PHASE ANGLE
11	-	.258575	-5.62434	.218499	-66.4974	.152780	-125.020	10-2187889.	-187.916
11	~	447040.	-185.630	.533336	-240.973	.411750	-303.020	.269165	-7.91574
17	•	c75855.	-5.82474	-218+99	464.00-	.152780	-125.020	.998761c-01	-147.916
20	,	c)190c.	-279.115	.25/155	-324.243	.174780	-10.2090	118298	-68.1083
12	2	1.37354	-41.6408	1.17985	-140.686	.825296	-148.630	.531561	-255.362
12	٥	.223519	150.507-	.25+91+	-310.312	.198443	-10.9570	.115672	-82.2653
53	1	.278571	-184.381	.245107	-226.571	.171555	-270.257	.10798+	-316.229
13	70	1.30267	-4.37730	1.23740	-20.7459	.80404.	1697.08-	.579883	110.101-
3	,	.157980	-195.022	.170210	-200.535	.192545	-270.603	.70-2476-01	-345.615
P3H	01	.278571	-184.307	.245107	176.822-	455171.	-270.257	.107984	-310.229
V3H	11	.367+55	-340.532	. 323627	-18.3526	.230749	-53.8545	.153094	-94.0788
КЗН	12	.230883	-201.73*	.14514	-247.066	.130589	-289.730	.782056E-01	-330.450
P2H	15	. 683071	-196.905	.252376	-243.940	.179357	-286.550	.115080	-333.464
H?A	14	.337920	1410.10-	.270520	-77.3405	.182629	-119.986	.109199	-106.229
KZH	15	.283671	-140.40>	.252378	-243.940	179357	-286.550	.115088	-335.464
NIC	16	1.00000		1.00000	-300.000	1.00000	-360.000	1.00000	-360.000
13	17	1.34670		1.08074	-55.4172	.672302	-87.0235	.518697	-126.560
13H	18	.240696		.241472	-340.961	180161.	-19.3905	.135829	-03.4102
TUO	1.4	.326104		.263087	-37.2052	.176725	-66.3420	136721	-108.303
*	07	1502800		.289571	-227.410	.201361	-268.179	.126273	-313.319
*	21	.616454	25.42-	.518024	-24.2694	.304910	-70.3803	.242321	-112.040
*	22	.36841 JE	5	-528661E-	-01 -188.650	w	-01 -271.196	1549255-01	-23.7149
5	55	-14097.		797877	-190.010	.147070	-232.008	.809189E-01	-270.879
2	54	.860938		. 193486	-324.715	.590938	-15.6157	044004.	-57.2350
5	25	+1671+.		.337528	-207.886	.197196	-240.400	.144100	-297.796
9.	07	.294804		158647.	-180.100	.170870	-217.136	.108620	-2+0.383
91	17	.12521.		. 147405	1-351.827	.712640	-24.7775	.594725	-55.897y
9	97	.480207	-209.687	.495759	-250.732	.356935	-271.810	.202035	+04.087-
7	54	.314553	-143.514	.281338	-177.701	.206105	-200-145	.145431	-231.235
1	30	.57887?	-323.174	.727545	-359.707	.719410	-32.7007	. 666637	-670.79-
.7	31	.568101	-248.617	.003318	-203.189	1+575+1	-301.597	.359986	-311.832
8	32	339392	-136.315	.321131	-171.143	.2495++	-198.61-	190427	-222.423
8	3.5	.40864.	-325.714	.025300	-4.05512	*08C00.	-38.4420	020650.	-67.8817
8	3.4	+<0<<9.	-41.173-	9491690	-310.082	.534778	-328.871	.426832	-330.934
6	35	.368303	-123.838	.305804	-106.233	.298262	-193.572	.240292	-217.156
61	36	.312161	-321.216	.512837	10650-1-	.581058	41.8031	.605921	-74.3150
63	37	.741775	-301-135	716062	-332.910	.607934	-353.089	996484.	-4.7091b
10	38	.400182	-129.490	. 410457	-102.549	.350268	-190.144	.293100	-213.855
110	2.5	.218367	-304.109	1414157	332640	.485675	42.3082	.525619	-74.8531
(1)	70	.430214	-320.349	.802900	-352.390	.685430	-14.2059	.547530	-28.0557
P111	4.1	.302427	1100.65-	.305047	-120.843	.364928	-143.098	.357500	-103.413
111	745	.544324	-220.044	.557584	-262.858	141044.	-295.940	.348622	-322.307
	43	1.28500	-52.2220	1.42126	-91.4580	1.21766	-173.809	1.03876	-149.420
13	6/83	7 5.34.27	-184.990	5.04860	-182.175	5.04003	-178.033	5.37000	-175.082
10	1/63	1 .927502	-181.442	.871443	-198.427	890560	-214.763	02001	-131 687
						00000	501.17	161471.	1000107

NUMBLE MODEL WITH VORGIX AUGMENTOR AND REMOTE FLOW SPLITTER USING EMPIRICAL COMBUSTION DATA

I CASE 8 NUMBER VONDIX*	KUMELE	VOKEL	X*REMUTE*E	REMUTE * EMPERICAL * JP4 * TAB & PLOT * TEST CASE	TABEPLOT*TEST	CASE		110 00 UEST	A Judinica and	-110 00 mm
		2	THE TORNE I	DENCT =130.00 HER IL	1	712000000000000000000000000000000000000	5	71 VO 00 00 1-	20000	PULSON PERILE
AKAMIEK	10 NO.		AIN		CAIN	PHASE ANGLE	CAIN	PHASE ANGLE	MAN	FIRST ANGLE
-	-	•	1240496-01		.804561E-01	-371.014	11521.	-22.0956	980+17.	1841 -66-
•	7	•	195125	-71.5930	.216823	-141.014	.331791	-202.096	.570945	-273.748
1	•	•	.72+0+9E-01		.804501E-01	-321.014	.123117	-22.0956	.21+086	-43.7481
2	4	•	468290E-01	-121.020	.981203E-01	-179.918	.153086	-230.795	.271582	-292.591
2	^	•	373905		+00746.	-15.2812	.572109	-00.4569	.923911	-132.321
2	٥	•	620801E-01		. 619503E-01	-175.442	.129020	-217.892	150772.	-268.960
3	1	•	7313236-01		.753713L-01	-48.8416	.110556	-85.1416	.197405	-131.004
1	0	•	436147		. 448483	-229.583	.705009	-275.430	1.28614	-332.527
3	•	•	4196935-01		.623021E-01	-54.7986	.500317E-01	1402.27- 10	.212987	-116.815
34	10	•	731323c-01		.753713E-01	-48.8418	.110558	-85.1416	.197405	-131.004
VSH	11	•	111776		.127625	-170.881	.212345	-210.580	.420090	-250.390
34	12	•	501246E-01		.485355E-01	-69.8238	.661151E-01	016-501-10	.108152	-150.555
2H	13	•	.799010E-01		.851125E-01	7401.89-	.130080	-105.904	.242073	-154.153
47	14	•	704792E-01	-210.341	.702151E-01	-255.380	.104683	-287.391	.202651	-330.430
2H	15	•	799016E-01	-19.3187	.851125E-01	-68.1057	.130080	-105.464	.242073	-124.153
NI	10	-	000000	-360.000	1.00000	-360.000	1.00000	-360.000	1.00000	-360.000
	11	•	395145		430475	-228.840	.719369	-277.009	1.12012	-338.900
H	18	•	104126	-107.132	.122510	-154.624	.205802	-192.471	.412519	-2+1.780
TUDO	19	•	100687	-157.741	110911.	-200.77>	.172815	-252.251	.259552	-305.022
5¢	20	•	880058E-01	-358.419	.917680E-01	7+50.05+7	.135961	-83.3776	.238974	-130.208
1	21	•	176060	-154.455	.145573	-202.849	.292302		.508453	-288.096
84	22	•	918U71E-02	-226.501	.139211E-01	-276.928	.599393E-01	11 -322.044	.150043	744.445
P5	23	•	50095+E-01	-308.078	.567751E-01	-347.721	.827102E-01		.140315	-58.5195
•	54		288989		.311180	-145.255	.467434		.828194	-224.052
•	52	•	860282E-01		.735241E-01	+750.00-	.960781E-01		175241	-257.838
•	26	•	734050E-01	-271.065	.0+7486E-01	-304.340	.844001E-01	11 -341.555	.139522	-31.0751
91	27	•	487902		*439304	-100.003	.463993	-138.285	149676.	-193.935
9	20	•	177460		.223091	-257.996	.371002	-260.176	.563684	-296.455
	24	•	108155		.944232E-01	-278.202	.105933	-313.091	.149443	-6.07902
	30	•	599415	•	.577831	-105.100	.610019	-128.355	.660350	-169.837
	31	•	298591		\$05705.	-295.971	.549823	-299.602	.820020	-329.231
	35	•	150435	-641.570	.133966	-264.040	.140293	-295.176	.171470	-242.118
VS	35	•	673519	-89.9001	•025064	-104.340	946919	-159.096	.705639	-162.378
80	34	•	364543	-535.447	.432769	-327.934	.623185	-330.681	.930045	-356.862
64	35	•	197010	-235.710	.179563	-255.394	185581.	-279.284	.214114	-321.112
68	30	•	589622	-95.0673	60++00.	-113.806	.668058	-131.387	.795098	-159.965
89	57	•	409390	-2.31078	.459263	-357,752	.632651	-359.228	.950568	-21.7942
10	30	•	246342	-234.000	.249415	500.647-	016662.	-209.545	.279509	-305.222
10	24	•	250447	-96.80+3	.539033	-117.178	\$85009.	-132.833	.753111	-157.809
10	40	•	756454	-24.2920	.477214	-20.6512	.615008	-47.0680	.904616	-46.0837
11	1.	•	335661	-174.471-	333005	-192.966	.356364	-205.301	.423883	-447.354
V11	42	•	281840	-337.671	.274605	-348.919	.322726	-1.0+160	.438372	-30.0077
11	54		884170	-165.778	0+0+00.	-177.955	.961337	-189.623	1.28757	-215-641
	6/16	1 5	5.90340	-175.504	0.01370	-180.741	6.92009	-190.295	6.51525	-201.523
P1	1/2		640046	-250.457	1.00746	-274.172	1.11560	-296.954	1.08450	-322.744
	1/83	7 1	.58977	-178.341	4-41820	-144.125	3.22333	-120.160	2.14727	-96.3498

RUMBLE MUDEL WITH YORBIX AUGMENTOR AND REMOTE FLUM SPLITTER USING EMPIRICAL COMBUSTION DATA

RUMBLE

1 CASE &		KUMBLE VORBIN*REMUTE	REMUTE * EMPERICAL * JP4 *	-	EST CASE				
		FREEDENCY	=1 70.00 HEX 12	, KELDENCY	=180.00 HENTZ	2	=140.00 HERIZ	2	=200.00 HEKIT
PARAMIER	TO NO.	CAIN	PHASE ANGLE	CAIN	PHASE ANGLE	CAIN	PHASE ANGLE	CAIN	PHASE ANGLE
10		.246075	-168.051	.208050	-234.105	.178844	-261.577	.100006	-350.314
11	7	064600.	050.040-	. 500077	-54.1046	. 481970	-101.377	.447535	-150.314
17	'1	.240075	-100.001	040802.	-234.105	.176644	-261.377	.100000	-350.31+
24	*	+1181c.	-357.760	015515.	-54.1801	.437952	-92.4380	.224710	-134.520
12	۸	.975392	-197.719	.753389	-252.079	.59+720	-200.347	.517900	-340.361
15	0	.316941	-7.59262	101015.	-71.4034	141406	-98.0134	.152099	-119.369
P3	1	-247040	-184.165	. 433748	-227.414	.220926	-257.520	.216324	-291.246
13	α	1.30022	-32.5507	1.01488	-81.7101	.730402	-109.159	182466.	-131.876
33	,	.22458	-207.440	.105262	-220.505	.188667	-251.902	.138+90	-303.247
Por	10	.247046	-104.185	. 433746	-227.414	.250920	-257.520	.216324	-291.248
V3H	11	.592500	-308.974	244444	1-525.747	1601547	-27.0859	.627984	-61.8123
ROH	12	.123750	-196.823	.107302	-239.271	-9528656-	01 -262.910	u	-01 -286.932
PZH	15	.314377	-208-079	.304679	-256.047	.295289	-288.745	.299418	-325.014
VZH	1,	.281177	-22-1405	7+1782.	-69.9023	.288100	-105.112	148965.	-140.01-
K2H	15	175+16.	-200.079	.30+079	-250.047	.295289	-288.745	.299418	-325.014
NIO	10	1.0000	-300.000	1.00000	-360.000	1.00000	-360.000	1.00000	-300.000
(3	17	1.14273	-33.0089	.938243	-85.9485	.591396	-120.298	.424733	-134.597
изн	18	.561507	950-167-	. 500369	-345.677	.553695	-18.5002	.269688	-55.0515
TOOL	15	.292204	-351.148	.252901	-35.4445	.209662	-54.1110	· £33975	-76.7991
P4	20	.294778	-161.270	.274117	-226.193	.255332	-255.312	.252264	-287.772
14	. 21	.014206	-337.196	.573343	-18.1058	.558941	-43.3309	-590215	-73.0007
**	5.5	.100470	-108.344	.196520	-125.158	.204683	-203.395	.176922	-244.032
62	5.5	.164259	-101-870	.141965	-125.669	.132273	-150.947	.140689	-170.290
15	54	1.03338	-471.016	.976126	-515.238	.925842	-339.636	.921465	-9.68102
52	52	+1c151.	-344.040	. 424590	-54.7350	-235664	-110.382	.228178	-148.904
96	97	.166263	-17.4942	119861.	-114.106	.161974	-130.953	.187382	-153.120
10	27	.610900	-250.373	.573054	-311.622	.573578	-343.429	.041100	-14.5641
92	28	. >20407	-330.524	.313194	-17.4806	.129190	-19.6239	-660139E-	v1 -358.492
14	52	.174645	-57.1400	.103592	-97.0080	.180995	-116.540	.217440	-141.000
11	20	.533666	-221.075	.328017	-215.567	.255686	-315.711	-282702	-1.22419
11	31	.824349	-3.72777	161165.	-22.9084	.471610	-37.1068	.436291	-49.7385
90	35	.182029	-34.7412	.170908	-78.3324	.180705	-101-650	.220932	-130.363
18	33	.553842	-201.559	. +1+920	-233.979	.302236	-251.812	159777	-274.915
91	34	.990629	-28.0100	155700.	-22.2000	.737300	-63.0999	.747304	-79.3840
54	60	.208289	-10.5507	C01671.	-55.1816	.187371	-82.90+6	-221045	-115.211
6.0	96	.746947.	-194.345	. 500590	-241.308	479369	-236.200	.430431	-255.677
89	37	1.05269	-51.5770	.916114	-76.6351	140048.	-86.3532	865446.	-103.774
P10	38	-265035	-344.399	.212312	-30.7344	.201939	-59.1610	.217746	-92.5075
710	3.4	.767.73	-190.106	.640023	-216.458	.563109	-232.134	c0817c.	-250.097
R10	0+	1.02621	-73.4307	.930022	-97.1557	.946724	-107.836	1.02474	-125.604
P11	41	.413231	-255.838	. 334357	-276.330	.3020+7	-288.857	.300159	-302.517
111	74	.460403	-00.5717	.404050	-99.1081	.392052	-118.158	.411520	-144.220
	45	1.34250	114.442-	1.14244	-278.880	1.08329	-295.561	1.10749	-318.472
	8/83	7 5.51238	-210.411	4.34176	-214.296	3.30010	-211.636	2.50173	-200.624
PI	1/23	7 .992652	-340.402	*<00048.	-6.69078	.809522	-23.8504	.760042	-39.0062
	1/83	1 1.00729	-73.052+	1.43041	-50.9161	1.36719	-31.3367	1.37485	-11.2690

RUMBLE MULEL MITH YURBIX AUGMENTUN AND REMOTE FLUM SPLITTER USING EMPIRICAL COMBUSTION DATA

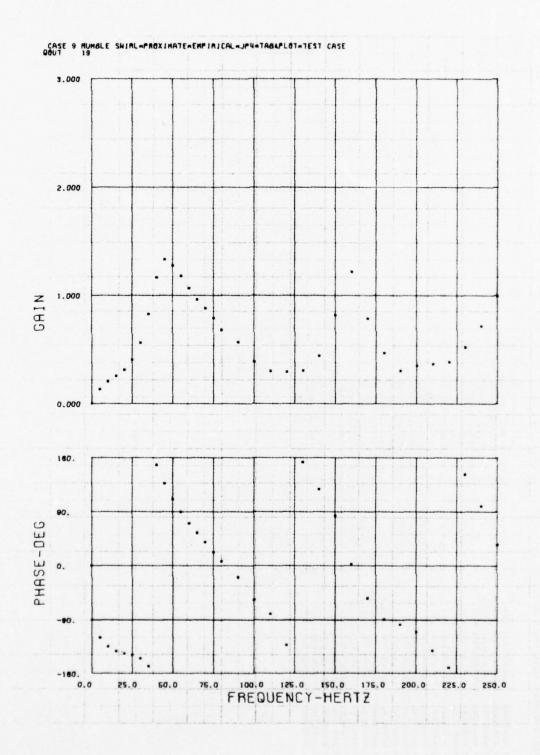
C. T. TELL								
	N. A.	PHA TANG	2	PHASE ANGLE	GAIN	PHASE ANGLE	GAIN	PHASE ANGLE
	.1560	-18.29.5	.144286	171.4047	.135438	-121.249	.135590	-177.100
,	** ** ***	-198.292	.383042	-451.410	.359605	-301.249	414595.	-257.160
1	.150833	-16.2925	.144200	-71.+097	.133438	-121.249	.133396	-177.160
,	.210950	-171.724	143541.	-216.071	117771.	-257.078	.178421	-303.962
5	+10039	-352.107	044744.	-26.9231	440374	-63.0625	*19994*	-106.380
0	.190570	-15%.665	.193895	-215.819	.159823	-208.229	.120852	-315.530
7	.210948	-324.755	414041.	-3.40474	.100125	-36.0960	.1539.5	-77.0101
n	+476924	-140.007	.4179.5	-104.68	. > > 4468	-167.730	.651200	-223.340
,	.141521	1-304.740	191004	-5.11774	.114579	-59.3936	.986239E-	-01 -04.9457
2	.210448	-324.985	.190435	-3.90474	.100125	-36.6980	.153945	-77.6761
11	491040.	-46.4301	27 64000	-136.506	.560162	-172.195	.545351	-212.447
12	.840090E-0	1 -314.535	-855242E-	11 -3+5-915	-815120E-	01 -14.6050	-841345E-	01 -49.3356
13	.247249	-1.20595	.270239	-42.8175	.248150	-80.3475	.230693	-122.18>
14	.301065	-170.004	180+87.	-218.900	.258554	-236.947	.250110	-299.420
11	.27727	-1.28595	657017.	44.8176	.248158	-40.3475	.230093	-144.185
10	1.00000	-300.000	1.00000	-360.000	1.00000	-300.000	1.00000	-360.000
17	.346414	-154.549	.301464	-155.429	.472025	-170.753	.560090	-219.610
18	.572345	-90.8530	.53087.	-151.795	.485800	-168.528	.465487	-209.438
1.5	.243404	-100.427	.249355	-137.155	.269473	-171.523	.280350	-213.061
97	.244507	-320.570	776122.	-356.226	.197429	-31.8767	.187025	-70.2981
17	.618379	-103.940	012058	-141.050	.590138	-175.353	. 603017	-215.107
77	.187022	-270.105	.172642	-331.177	.116109	-11.3549	111001.	-42.3324
23	.154103	-174.430	.101849	-122.251	.165010	-251.061	.176650	-200.307
54	.841400	-40.1320	1128217	-15.5742	*65469*	-106.271	.637749	-141.430
52	.248114	-190.215	.192778	-234.450	.176695	-226.333	.190218	-248.422
97	.214425	-177.212	.232015	-208.182	.235575	-230.304	.246111	-269.010
17	.090505	-42.5143	.102410	-71.91+0	.672370	-94.4843	.661355	-118.08+
28	.100044	-303.966	.125160	-308.318	.200050	-299.576	961817.	-317.451
53	.255105	-107.347	7719177	-196.947	.284276	-220.163	.297039	-456.715
30	.333810	-36.1509	.392000	-65.6574	.421382	-91.2688	.483028	-111.131
31	.393263	-59.0960	.313426	-76.6527	.196069	-74.0246	.177159	-55.7634
32	.205400	-157.920	.297109	-190.343	.305169	-217.008	.322419	-240.100
33	.171454	-512.073	.138525	-1.31850	.147958	-39.37+3	.221153	-74.0745
34	.743186	-95.2157	.009315	-117.602	.539136	-129.573	.457097	-140.508
35	.259935	-145.443	.285680	-179.265	.295344	-206.075	.316170	-234.540
36	.402456	-275.755	.359035	-301.428	.334977	-325.643	<b>.330575</b>	456070E-01
37	-983002	-121.185	106766.	-143.942	.837953	-158.306	.787319	-173.696
38	.2+1858	-120.085	+07962.	-101.005	.262833	-189.374	.282457	-218.103
24	. 583257	-204.970	.572240	-294.019	.500443	-316.206	2774772.	-343.909
04	1.09154	-145.515	1.07435	-166.031	1.00810	-181.043	.995985	-197.307
41	.316740	-517.216	. 550172	-337.635	.343090	-356.621	.304264	-20.5611
74	.420886	-170.242	.410178	-200.684	.375871	-222.823	.367420	-245.351
2,	1.13250	-341.475	1.08531	-8.69631	1.01974	-28.7686	1.02598	-50.8656
8/13	7 2.26091	-181.082	2.50943	-100.977	3.21727	-149.032	4.23008	-145.650
140	1 .7+3560	-53.3079	757553	- FAT 5000	072270	003 4 60		0.00
				10000	0475000	0000000	.00000.	1404.44

RUMBLE MUDEL WITH VUNBIX AUGMENTON AND NEMOTE FLOW SPLITTER USING EMPIRICAL COMBUSTION DATA

KUMBLE LASE &	KUMBL	RUMBLE 1 CASE & RUMBLE VURBINEREMENT	And a ser	1841410142441442414451444144514141451	14H&PL01+1E	SI CASE							
		FREJULNEY	CNCY = 2	SU.UU HERTA	FREUDENCY	0.0	HER TZ	FREGUENCY =	0.0	HEKT 2	FREQUENCY	0.0 =	HER 12
PANAMICK ID NU.	ID NO.			MASE	NIAD	PHASE	ANGLE	GAIN	PHASE	ANGLE	GAIN	PHASE	ANGLE
14	-	.14			0.	0.		0.	0.		0.	3.	
1	2	1785.	7765	-57.0546	0.	0.		0.	0.		0.	0.	
11	3	.143695	695	-237.000	0.	0.		0.	0.		9.	3.	
7.	1	.180	3+7	-355.400	0.	0.		0.	0.		•	0.	
	^	.565355	355	-155.606	0.			0.	0.		0.	0.	
15	0	AC11.	0415	-340.917	٠.	0.		9.	0.		0.	0.	
3	1	.140	+75	-116.477	0.	0.		0.	0.		0.	0.	
13	æ	.74U574	574	-207.443	0.	0.		0.	0.		0.	0.	
13	,	.1257	103	-127.043	0.	0.		0.	0.		3.	2.	
13H	10	.140475	475	-118.477	?	2.		3.	0.		0.	9.	
134	11	.5421	195	-254.030	0.	0.		0.	0.		0.		
RSH	12	.890	7154-01	-87.7765	0.	?		0.	0.		0.	0.	
15H	13	.2312	622	-165.930	. 0.	0.		0.	0.		3.	0.	
124	14	.247	770	-344.132	0.	0.		0.	0.		0.	?	
12H	12	5165.	553	-165.430		0.		٥.	3.		0.	0.	
NI	10	1.000	200	-360.000	0.	٥.		0.	0.		0.	0.	
13	17	0660.	522	-260.754	0.	0.		0.	0.		0.	0.	
13H	18	.455	100	-254.002	?	3.		0.	0.		0.	0.	
100	15	\$305.	126	-256.195	0.	3.		0.	0.		0.	0.	
*	20	.1627	774	-110.6+0	0.	0.		0.	0.		0.	3.	
4	17	.6286	189	-258.168	0.	0.		0.	0.		0.	0.	
+	22	3996.	944E-01	-40.7869	0.	0.		0.	0.		0.	0.	
P5	53	.1900	689	-325.536	0.			0.	0.		0.	0.	
5	47	1100.	538	-177.796	0.	0.		0.	0.		0.	9.	
2	52	1651.	130	-335.918	0.	0.		0.	0.		0.	3.	
9	50	.1551	290	-304.882	0.	0.		0.	0.		0.	3.	
0	27	\$440.	255	-140.840	0.	0.		0.	0.		0.	?.	
9	58	.3511	144	-334.554	0.	0.		0.	•		0.	•	
1	52	.2992	112	-284.312	0.	0.		0.	0.		0.	0.	
1	30	.5580	olo	-130.925	0.	0.		٥.	٥.		0.	0.	
1	21	.2455	571	-40.6305	0.			0.	0.		0.	0.	
80	35	.3276	615	-270.169	٥.	٥.		0.	0.		٠.	?.	
9	33	.3275	265	-104.202	0.	0.		0.	0.		0.	3.	
0	34	.3782	212	-143.716	0.	0.		0.	0.		0.	0.	
5	35	.3278	830	-262.573	0.			0.	0.		0.	0.	
51	36	.3412	597	-40.0510	0.	?		0.	0.		0.	0.	
89	37	.727.	104	-166.388	0.	0.		0.	•		0.		
10	38	867.	375	-246.032	0.			9.	0.		0.	0.	
1,	36	.5724	487	-15.0648	0.	0.		٥.	٥.		٥.	0.	
10	40	.9820	040	-211.980	?.	0.		0.	0.		0.	0.	
11	+	3476.	299	-46.7810	0.	0.		0.	0.		0.	0.	
V11	45	.3006	854	-265.527	0.	0.		0.	0.		0.	0.	
	+3	1.053	3+0	-72.6240	٥.	0.		0.	0.		0.	0.	
	6/63	7 5.37754	154	-148.900		0.		0.	0.		0.	0.	
P1	1/83	7 .9823	287	-119.382	3.	٥.		0.			0.	?	
	1/83	7 2.566	909	-266.303	0.	0.		0.	0.		0.	0.	

RUMBLE MODEL WITH YORBIX AUGMENTOR AND REMUTE FLOW SPLITTER USING EMPIRICAL COMBUSTION DATA

1 CASE 3 KUMBLE VUKBIX	KUMBLE	VOREIX * REMOTE FREQUENCY	*KEMUTE*EMPERICAL*JP4*IASEPLOI*IESI QUENCY = 0.01 HENIZ FREQUENCY =	FREQUENCY =	0.0 HENTZ	TE FREUUENCY =	0.0	HENT Z	FREQUENCY =	0.0	HER 12
PARAMTER 10 NO	ID NO.	CAIN	PHASE ANGLE	CAIN			100	ANGLE	GAIN	PHASE	
PI	1	.252417	628355-01	0.		0.	0.		0.	0.	
V1	7	.081589	-180.003	2.	0.	2.	0.		0.	0.	
81	2	1252417	6283336-01		0.	0.	0.		0.	0.	
P2	+	.340100	540 7042-01	9.	0.	0.	0.		0.	?	
42	۸	.766032	-180.046	0.	0.	0.	0.		0.	0.	
82	0	.340100	009050E-01	0.	0.	0.	0.		0.		
P3	1	.340160	467643E-01	٠.		0.	0.		0.	0.	
V3	8	.708832	-180.027	0.	0.	0.	0.		0.		
83	,	.340160	767717E-61	0.	0.	0.			0.		
PJH	110	.340100	487043E-01		0.	0.	0.		0.	0.	
V3H	11	- 4	-01 -179.935	0.	0.	•	٥.		0.	?	
кзн	12	.340160	505U17E-01	0.	0.	0.	0.		0.	0.	
15H	13	.340160	+40142E-01		0.	0.	0.		0.	0.	
12H	14	111	-01 -175.555	0.	0.	0.	0.		0.	0.	
12H	15	.340100	+901+2E-01	٥.	0.	2.	0.		0.	0.	
NI	10	1.00000	-300.000	٠.	0.	0.	0.		0.	0.	
13	17	.42667	-179.500	٥.	٥.	٥.	٥.		0.	0.	
13H	10	1162525	905657E-01	2.	0.	••	0.		0.	0.	
TUO	1,4		-03 -90.0242	0.	0.	0.	0.		0.	0.	
*	50	366295.	4010C4L-01	•	0.	0.	0.		0.	0.	
*	21	.238095	-179.997	0.	0.	0.	0.		٥.	?	
+	22	.236095	677090E-01	0.	0.	0.	0.		0.		
64	5.5	36,056	445651E-01	0.	٥.	0.	0.		0.	0.	
15	54	-238095	-179.970	0.	•	0.	٥.		٥.	0.	
52	25	.238095	636423E-01	0.	0.	0.	0		0.	0.	
90	26	.357033			0.	0.	0.		0.	0.	
91	27	-2226335-01		0.	0.	0.			0.	0.	
Ro	28	.21050+c-0	_	0.	٥.	0.	0.		0.	0.	
7	67	.350770	404725-01	0.	0.	0.	0.		0.	9.	
1	30	170711.	197140E-02	٥.	0.	0.	0.		•	?	
7	31	113505	-179.627	0.	0.	0.	0.		0.	•	
æ	32	.343681	475284E-01	0.	0.	0.	0.		0.	0.	
40	5.5	499407.	255.456	0.	0.	0.	?		0.		
88	34	.206591	-179.905	2.	0.	٥.	0.		0.	•	
64	35	4333445	488110E-01	0.	0.	0.	0.		0.		
61	00	-274162	255.550	0.	0.	0.	•		0.	?	
89	37	.276247	-179.930	0.	0.	0.	٠.		0.		
10	38	.325851	503705E-01	0.	0.	0.	0.		0.	0.	
10	54	1.326827	-354.448		0.	0.	0.		0.	0.	
01	0+	.331601	-179.944	0.	0.	0.	0.		0.	0.	
11	+1	.325851	509336E-01	0.	0.	0.			0.	0.	
V11	74	179976.	519991E-02	0.		0.	0.		0.	?	
	4.0	.331801	-179.900	٥.	0.	0.	0.		0.		
3 8	8/P3	7 4.20021	-175.476	0.	0.	0.	0.		٥.	2	
1 1	1/83	7 .743523	140712E-01	0.	0.	0.	0.		0.	0.	
111 41	41/P3	7 .957934	216931E-02	0.	0.	·•	0.		0.	0.	



RUMBLE MODEL WITH SMIKE AUGMENTUR AND PROXIMATE FLOW SPLITTER USING EMPIRICAL COMBUSTION DATA

CASE 9 RUMBLE SMINL\*PRUXIMATE\*EMPERICAL\*JP4\*TABBPLUT\*TEST CASE

:	WAKNING	1	PAKAMETER	BPK	11	. 54000	15	ď	DEFAULT	VALUE	
***	MANNING		PARAMETER	FAV	11		15	4	DEFAULT	VALUE	
*	MANNING		PARAMETER	JFUEL	**	-	57	4	DEFAULT	VALUE	
:	MANNING	1	PANAMETER	N MOL	it	.15000	15	4	DEFAULT	VALUE	
***	WAKNING		PAKAMETER	MOH	11	. 00082.	15	4	DLFAULT	VALUE	
*	WARNING	1	PARAMETEK	OPU	**	.64000E-01	15	4	DEFAULT	VALUE	
:	MAKNING	1	PANAMETER	OPS	**	9.	15	4	DEFAULT	VALUE	
*	MARNING	1	PARAMETER	LA	11	84.000	15	4	DEFAULT	VALUE	
*	MARNING	1	PAKAMETER	רנ	#	12.000	15	4	DEFAULT	VALUE	
*	MAKNING	1	PANAMETER	5	11	14.000	2	4	DEFAULT	VALUE	
**	MAKNING	1	PANAMETER	77	11	36.000	15	1	DEFAULT	VALUE	
*	MARNING	1	PARAMETER	MOK	ii	00077-	24	4	DEFAULT	VALUE	
*	MAKNING	1	PAKAMETER	NESCH	10	7	21	4	DEFAULT	VALUE	
*	WARNING	1	PAKAMETER	NPRNIK	11	0	15	4	DEFAULT	VALUE	
*	MARNING	1	PARAMETER	PANOL	**	4.4000	1	4	DEFAULT	VALUE	
*	MARNING	1	PANAMETER	TOURE	**	. 501 JUE - 42	2	4	DEFAULT	VALUE	
:	MARNING	1	PAKAMETER	LB	#	66.000	IS	•	DEFAULT	VALUE	
*	MARNING	1	PANAMETER	7	11	2.0000	15	4	DEFAULT	VALUE	
*	WARNING	1	PARAMETER	160	11	700.00	15	4	DEFAULT	VALUE	
**	MARNING	t	PARAMETER	LEFP	11	. 0.	15	4	DEFAULT	VALUE	
*	WARNING	1	PARAMETER	TEP .	"	0.	15	4	DEFAULT	VALUE	

	* FA=																																,ZEFP=	
	.680000007	· LH=		. P So=	0.														•														800000012	
	, ETA=	72.0000000	.279999971	4.39999962	•	0.	2.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.			
		,LC= 72.	11		0.				•			•				•	•	•					•	•							•		, ZEF=	
	0.			O,PRNOZ=	•														0.															
	-02, UPS	66.0000000	.1+9999970					0	•••		0	0	0	0	0		0	0	. 00	0	0.	0	0	0.	0	0	0	0	0	0	0.	0.	0.	
	.49999886E-02, UPS=	, Lb= 6	· MOC=	1 , NPRNTR=	0.														1780.00000															
		0000	30.000000	1,0		0.	٥.	0	0.	0.	0.	0	0.	0.	0.	0.	0.	0.	*T6H=	0.	0.	0.	0.	0.	0.	0.	0.	0	0.	0.	0.	0.	0.	
	-01,0PH	84.0000000			0																													
	.040000103E-01,DPHS=	1,LA=	, L2=	1,NFSOP=	0000		0.	0.	0.	0.	0.	٥.		0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	
			50.000000		700.00000		•																			•	•	•			•			
	-4499498401-02,UPL=	.Jruel=	, LK= 30.	3, NCUMUP=	02, Toi=	0.	0.	0.	0.	0.	0.	0.	0.	0.	٥.	0.	0.	0.	0.	0.	0.	0.	0	0.		0.	0.	0.	2.	0.	0.	0.	0.	
	4854664	. 216000010E-01, Jruel=	, ,,,,		. 477474670E -02, Tois																													
	,DPCS#	.2100		F																														°.
VALUES		IL FAV=		"NAUGOP=	*1CURE=		0	0.	0	0	0.	0.		0	0.		0	0	0	0	0.	٠	0.	0	0	0	0.	0	0.	0.			0.	*ZEP=
NAMELIST INPUT VALUES	+74449484. = ASH44474	.500000007=-01,FAV=	14.0000000	470000077.	000000000																													

THIS PRUGRAM CHECKS SPECIFIC INPUTS TO ENSURE REASONABLE INPUT DATA.

IF THESE CHECKS ARE NOT SATISFIED THE JOB WILL BE TERMINATED.

VIOLATIONS, IF ANY, WILL BE PRINTED BELOW—

.24501	1-	.DCUCLULZE_01;ETAAB= 20c1 ,XEMY= 18050	TAAb= .075999948	as DTIAb=	2553.10986		DIADE 1737.47461		- TOM	
6VSCUT 1737.47461 ,UIIZIF= DT= 1737.47461 ,UIIZIF= DTII= 3510.05407 ,FAT= GENO		720359300c+47,FAV11=		.132072548E-01,ToM=	1379.24561	.1 F=	417.910869	= 4I10.	462.444624	4854
L= 30.000000 , 30.	3.00000000	, 16.0000000	0	• 00000	000000000	1.5.	000000000	3.00000000	• 000	
	38.0000000 115.000000	72.0000000	88.000000	88.0000000	93.0000000	•	00000000.86	. 103.000000	0000	
£65J C= 15504.4609 , 155 27921.4727 , 29777 £END	15504.4009	, 15504.+609	, 21410.4805	.4805 , USI ,CH=	21410.4805	, 237	23798.7187	, 25944.9570	, 076	
.149599976	. 149999970	.365589032	, .220000029	, MH=	.220000029	25	.250041704	, 279937923	, 624	
700.000000 21.73022 ,	700.000000	3116.72021	, 1379.24561	24561 , TH=	1379.24561	, 172	1720.74048	2074.23535	, 555	
1.38572167	1.29577157	1.29254219	, 1.34500408	20408 , 6H≥	1.34500408	. 1.3	1.32737100	1.31326869	* 00	
SEND GTAUFA GTAUFE .2019US472c-02, .2019US472i .131193417c-U3, .120957U7cc-U3, GEND	.201905472E-02; 5707cE-03; .83;	02; .897357700E-U3; .835605159E-U3; .0	.0.	.191418527E-03,	3, .178765418E-U3,	8E-03.	.1587682035-03,		.143473380E-U3,	603
.273106131E- 254555E-03,	.2+96+0318E-03; .17;	.179000492E-02, .0	.00	.299397856E-03, ,TAUGH=	3, .287441770E-03, 5H= .805446412E-03	0E-03,	.271407304E-03,		.2613908156-03,	,50
£TAUE. TAUE: .154754157E-01, .542344991E-C5, .2.94	01, .154744157E-01,	01, .667973946E-02, .312124402E-02, .0	.0.	.106150191E-02,	2, .946704551E-03, EH= .207114848E-02	1E-03,	.703729447E-03,		.0.0483310E-03,	03,
600PJ 90P= .0 , .0 1003.83252 , 1103.161 8END	.00.10138	, .0	٠		925-305176		973.436279	, 1020.11743	11743	

RUMBLE MODEL WITH SWINE AUGMENTUR AND PROXIMATE FLOW SPLITTER USING EMPIRICAL COMBUSTION DATA

RUMPLE									
I CASE S	AUMOLE	# .	Y	4* TADEPLOT*T	EST CASE				
1000		The COENCY		TRUEDENCY =	SOU HERIT	PREMOENCY #	TO-OU HERIT	FREGUENCY =	15.00 HEKIZ
PAKARIEK	10 NO.	CAIN	PHASE ANGLE	CAIN	PHASE ANGLE	CAIN	PHASE ANGLE	CAIN	PHASE ANGLE
14	1	619417	1300.000	. 240302	1006.67-	504007	-34.4525	.197663	-49.3348
<1	7	5/04/7	-180.000	>05047.	-205-960	.206463	-219.453	.199663	-224.335
RI	7	.27+675	-360.000	.240302	-25.9001	.206403	-39.4525	.199663	-45.3348
P.2	1	.309634	1000.000-	902017	-22.1981	.231614	-31.9123	.222606	-37.9836
7.	^	228408.	-180.000	.487105	-145.547	.285881	-182.365	.325201	-179.882
K2	0	.204634	-360.000	.262975	-29.3467	.206043	-45.1670	.170803	-54.7958
P3	7	.309834	-300.000	.208713	1440.07-	.224830	-20.6782	.206102	-32.7905
VS	a	.309ds.	-160.000-	.347460	-166.486	.389671	-159.435	.499512	-156.025
X Co	7	.304854	-360.000	.242685	-35.2005	.148704	-49.7256	.100523	-35.2929
P3h	10	*309034	-360.000	2768020	-20.2423	.225569	-27.9279	.209319	-31.7474
V.SH	11	+50406.	-180.000	0406070	-197.012	.220824	-202.082	.211932	-203.916
KSH	1.2	.309634	000.000-	. 408434	-21.3373	660577	-50.1164	.200339	-35.0259
Р2н	13	.309834	-360.096	110697.	9626.07-	.225721	-29.4031	.209637	-33.9609
VZH	14	453405.	-180.000	£10697.	-200.980	.225721	-209.403	.209637	-213.961
R2H	15	.309834	-366.000	110697.	-20.9798	.225721	-24.4031	.204637	-33.4009
217	10	1.00000	-300.000	1.00000	-300.000	1.00000	-300.000	1.00000	-360.000
E.	17	.140×74E-06	-300.000	.239052	-120.636	.307237	-137.025	.450387	-145.112
HOM	10	1715961-16	0 -360.060	.175001E-U	1 -111.152	.293408E-01	-119.754	.408363E-U	11 -124.488
1007	19	.0915206-0	7 -360.000	.131027	-119.774	.203569	-134.986	.255920	-142.433
<b>5</b> d	20	.312947	-360.000	170172.	-20.2107	.227843	-27.6047	.211437	-31.0525
٧٠	21	1,912947	-100.000	.470942	-191.311	.245372	-140.719	.247825	-187.382
K4	22	.312947	-300.000	.262948	-32.3618	.203386	-44.4543	.1760i4	-58.3739
29	23	. 512947		.271137	-19.2485	.226025	-25.9100	.207618	-28.6382
45	54	1,71,541		. 262923	++4.+81-	.203879	-179.506	.282302	-173.224
K5	57	1,516947		667567.	-22.5979	.180992	-51.1619	.157751	-59.4124
0	50	10/0000		.264576	-14.5743	.216813	-26.1747	.20001.	144.87-
9	17	.105542		· 14.00 14E-U	1 -171.220	.>010>be-01	-107.042	.787139E-0	_
X0	28	•104784		.142125	-91.2910	.172328	-124.646	.187568	-148.518
14	**	.30001+		. 437501	-14.9694	.211126	-26.4575	192006	-28.4220
//	20	.341551E-0		.725866E-U1		.987336E-01	-15.0753	112211.	-41.5860
X	51	.349.512-01		.200302	-107.905	.282250	-157.594	.316233	-169.852
PB	25	095787		511647.	-20.3899	.202813	-20.7775	.183420	-20.2708
100	33 ,	.135/64		166511.	-357.508	•203568	-14.00+7	.213235	-26.0898
KS	34	.136/14		.282532	-154.328	.376724	-168.180	.410780	-179.211
7.	35	*28+305		.241239	-20.8755	.19369d	-27.1567	140+11.	-28.1133
**	31	014617.		. 252813	135962E-01	.28++36	-12.7478	-294702	-20.3243
200	21	*215165		685555.	-102.013	.452441	-174.324	*495594	-135.350
P.10	20	574485		201690	-21.4557	.183559	-27.0251	.10001.	-27.9362
VIC	25	.210800		.316341	-1.58120	.349525	-13.3939	.300932	-20.0409
N. C.	100	.270620		. +12966	-166,031	.514674	-178.650	.559820	-190.039
111	1+	-214485		. 233671	6710-77-	.186756	-29.4553	.164469	-32.7043
V11	74	0000017.		. 307763	18547.4-	.341854	-10.8854	.359313	-30.25%
KII	4.5	.276620		.400349	-174.063	.503562	-192.074	.55+3+5	-209.580
	2/10	1.00000	-180.000	1.21802	-147.841	1.73318	-130.757	2.40032	-123.224
	1/23	1 .666.723	0.	.694272	-5.01535	.919039	-10.7743	.939450	-16.5302
P11 41	1/2	7 .887524	0.	666608.	-1.36813	.830051	-1.27705	.790326	-359.908

RUMBLE MODEL WITH SMIRL AUGMENTUR AND PRUXIMATE FLOW SPLITTER USING EMPIRICAL COMBUSTION DATA

KUMELE									
	9 KUMLLE	SWIKL*PRUNIMAT	PRUNIMATE *EMPERICAL*JP4*TABEPLUT*TEST CASE	*TABEPLOT*	TEST CASE	COEDUCAIC	200000	N N N N N N N N N N N N N N N N N N N	11 00 45 -
DACAMTLE	2	TREEDENCY II	EHACE ANG E	TREADENCE	DHAVE ANGLE	1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	PHANT ANGLE	CAIN C	PHASE ANGLE
-	7	CALIN	THASE ANGLE	27770	THASE ANGLE	255593	-87 0776	20486	-68.287#
1.7		000003.	2000	201742	-221 403	255563	-252 675	325802	-278 288
	,	200002.	-240.330	001177	100-167-	66666	914.797	20075	007.017
K.	2	200000	-60.0338	06/1770	-11.0014	545557	21.6.70-	240676	23.00.0
P.2	1	555555	742.144	567747.	1794.76-	+05017.	1179.66-	+100+0	-11.0310
42	^	.347132	-181-804	6055640	-180.420	.652/38	185.241-	. 735/40	-203-111
RZ	9	.143936	1646.00-	.127926	-57.6162	.144489	-48.6137	-218117	-48.5224
P3	1	-207592	-37.5285	.200179	-41.7510	.208838	-44.9370	.237242	0104.05-
VS	0	+7+440.	-157.965	. 520524	-102.24	1.080++	-167.675	1.52565	-177.002
83	5	.151250	-19.5272	.102010	-01.1620	.207829	-53.2089	.180705	-61.110+
Poh	10	.203960	-36.1583	.202516	-24.4643	.212735	-42.0502	.244693	47.0811
V3H	11	.208470	-405.785	+3+61-2.	-207.105	.225223	-207.372	.261018	-210.002
R3H	12	.264263	-40.5419	.199885	-45.4000	.208760	-49.1615	.238470	-55.2515
PZH	13	.204511	-39.1110	.205572	-43.6573	.214032	47.0846	.246725	-52.8593
VZH	14	.20+511	-219.111	.293372	-223.057	.214032	-227.085	-246725	-232.659
RZH	15	.204511	-29.1110	.203372	-43.0573	.214032	-47.0848	.240725	-52.8593
CIN	16	1.00000	-360.000	1.00000	-300.000	1.00000	-360.000	1.00000	-360.000
W3	17	.555100	-148.907	.714018	-101.149	1.01240	-150.900	1.51574	-170.630
MOH	16	.530310E-0	01 -129.614	-657625E-	01 -134.533	.828657E-01	1 -136.150	0111111.	-144.071
TOO	19	.313309	-146.209	.403254	-148.926	.562280	-154.641	.827180	-107.768
* 4	20	.205033	-36.0319	.204587	-39.8004	.214927	-42.4609	.247237	-47.460>
44	77	.269104	-180.035	.303100	-165.767	.365622	-186.312	.48+860	-191-335
R4	22	174627	-06.22.08	.192285	0668.77-	.223339	-92.3784	.205419	-120.849
P5	2.3	.199568	-31.8377	.194194	-34.2203	.199279	-35.1561	.223428	-37.9088
45	54	.321368	-170.392	.373168	-109.412	2425752		096709.	-175.897
RS	25	.117397	-68.2226	.101224	-68.6110	.813510E-01		.110307	-214.719
96	50	.191525	-31.2946	.100406	-23.0078	.192634	-33.0717	.21,4665	-33.2745
46	1.7	.120950	-139.705	.170+52	-146.923	.244617	-148.497	.364815	-160.253
Ro	28	.207406	-158.811	.245976	-108.089	.302345	-183.751	.365134	-207.274
P7	57	.183412	-30.0641	.178009	-51.0424	.186398	-30.8500	.210001	-32.0813
17	30	.125574	-04.2662	+12541.	-02.3405	1195911	-107.445	.269061	-133.849
R7	31	.345230	-177.755	. 592438	-185.333	.461053	-196.588	.530546	-514.498
Pæ	32	.174037	-25.9410	.170582	-30.1078	.100306	-28.4665	.214043	-30.0995
^^	33	.217713	1910.441	.227502	-60.2954	-247685	-80.5265	.278664	-108.194
RB	34	795644.	-187.254	.5005 > 2	-195.022	+61575.	-205.715	.658981	-222.033
54	35	.165584	-29.1044	.162102	-28.3501	.174119	-25.8650	.211500	-27.4780
5>	20	0069670	-39.3065	4040000	-22.2014	.320493	-70.3562	.332540	-92.9736
X.5	37	.530524	-193.995	. 584034	-202.375	.662445	-213.231	.752227	140.677-
P10	28	125401	-28.1152	.152930	-26.3038	.107622	-22.4554	-208802	-24.7473
VIC	39	.306283	-38.2302	.375209	-51.0619	.388043	-66.6386	.394124	-87.4158
RIO	04	.590330	-159.363	.051035	-208.458	.732825	-219.704	.827210	-435.445
P11	41	.150900	-35.3080	.138415	-35.7909	.135349	-31.08+8	154796	-27.7580
Vil	74	.374620	-42.5000	360666.	-55.4307	****	-69.6003	443235	-88.0972
R11	43	766665	-424.004	+14070-	-239.416	.779556	-255.793	.919784	-270.494
	5/13	7 5.18556	-140.457	4.10048	-120.473	5.17358	-122.736	VL004.0	-127.261
PI	1/23	1 1.02133	-22.8075	1.10780	-24.8504	1.22388	-38.0406	1.37367	-41.880J
PII	+1/P3	1 .745451	-357.840	1691457	-354.040	.648104	-340.748	.652484	-337.357

RUMELE MUDGEL WITH SWIRL AUGMENTUR AND PROXIMATE FLUM SPEITTER USING EMPIRICAL COMBUSTION DATA

Colored   Colo		FREDUCINCY =	40.00 HEKT	ENCY = 40.00 HERTL FREQUENCY = 45.00 H	: 45.00 HER 14	FREQUENCY	= 50.00 HERIZ	FREQUENCY =	35.00 HERT
1	ANAMTER ID NO.	GAIN	PHASE ANGLE	GAIN	PHASE ANGLE	GAIN	PHANE ANGLE	GAIN	PHASE ANGIE
1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1,	1 1	.430072	-123.511	164064.	-157.092	110164.		.470733	-213-474
1,000   1,00	11 2	.430672	-102.511	264064.	-357.092	170764.	-9.41134	. 4707.	-34.4735
1.370.35   1.25.01.37   1.00.000   1.21.02.0   1.871.00   1.98.0	11 3	.436872	-123.511	.490434	-157.092	170764.	-189.211	.+707.	-219.474
1,2043   1,2043   1,12840   1,22840   1,28410   1,2840	+ 2.	.440010	-92.0157	.506666	-121.220	.496516	-148.808	.459615	-174.301
1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1,	7	1.37095	-225.438	1.72800	170.962-	1.87186	-285.497	1.89869	-313.401
1,175	2	.252000	-01.6148	. +75533	T004.44-	.522870	-134.155	.510355	-167.735
1	9	+57752.	-03.4.60-	+47587.	-01.6431	.265702	-95.8800	.251141	-106.738
1,7000e  1000e  1000e  19,7260   1319364   -6,0031   136624   1000e		4517159	-197.000	01640.7	-240.530	2.74817	-255.744	2.04850	-278.955
10   129104   -00.1503   -227.349   -2288372   -297.349   -220.239   -220.2		.170050E-U	1 -102.915	.150066	-19.7260	.319368	-60.0351	1470950	-104.524
1	1	.291641	-60.5835	.305177	-79.3699	.288372	-94.3319	.273974	-106.351
12	1	.310239	707.052-	. 338383	-227.340	.326816	-250.228	.317015	-260.472
3	1	.281397	-69.2003	.242400	-89.0383	+64512.	-104.955	.256907	-118.005
1,	I	.23+204	-00.5072	.309384	-00.00-	.293291	-101.754	.279643	-114.527
5	-	.29450+	106.047-	+006000.	-200.061	.293291	-281.754	.279643	-294.527
16   1,00000	1	.274664	-60.5072	. 209284	-00.0014	162567	-101.754	.479645	-114.527
17   2.1722   -192.616   -226.084   -28498   -255.522   2.28432   -197.689   -197.689   -197.689   -197.689   -197.689   -197.689   -197.689   -197.689   -197.689   -197.689   -197.689   -197.689   -197.689   -197.689   -197.689   -197.681   -294.97   -20.3317   -20.3377   -20.3377   -29.347   -29.359   -195.520   -29.349	1	1.00000	-360.000	1.00000	-300.000	1.00000	-360.000	1.00000	-360.000
18	-	2.17229	-195.616	4.51616	-226.084	2.43908	-255.522	2.28432	-278.064
1         1,100707         -1942,022         -1233,170         1,27643         -249,361         1,18116           2         -601130         -2010470         -294047         -202,331         -276904         -275,361         -276904           2         -601130         -2010470         -294047         -202,331         -19120         -202,361         -19120           2         -229463         -476024         -200,472         -294026         -74,4104         -253114           2         -229463         -476024         -200,472         -294026         -74,4104         -253114           2         -229463         -476024         -200,472         -210,404         -225,414         -253114           2         -229467         -476024         -200,474         -210,404         -276,414         -253114           2         -229467         -47704         -210,404         -276,404         -276,404         -276,404           2         -22460         -476,404         -276,404         -276,404         -276,404         -276,404         -276,404         -276,404         -276,404         -276,404         -276,404         -276,404         -276,404         -276,404         -276,404         -276,404         -276,404	1	.150895	-157.680	.177816	196.771-	.186480	-145.448	.194639	-206.366
24	7	1.16707	-192.029	1.33321	-223.170	1.27643	-249.361	1.18136	-270.590
21	2	1.50462.	-00.3517	. 308418	-79.1070	.291472	-94.0131	.276900	-100.007
22	2	.601130	- 400.018	.178555	-230.375	. 790443	-252.553	.755270	-272.591
23	2	.294572	-157.601	.225+80	-200.727	.181770	-233.348	.141323	-259.849
24         -800000         -100.104         -110.254         -912000         -22.561         -64469           25         -239763         -276.294         -397774         -328.607         -398812         -5.22567         -413605           26         -239763         -276.294         -014.29         -261916         -5.25.034         -51770           27         -226.60         -106.199         -10.340         -10.209         -253.974         -584046           26         -390273         -274.306         -307442         -266.371         -10.209         -253.974         -584046           27         -260000         -43.1023         -274.404         -70.9003         -261109           28         -260000         -43.1023         -274.510         -236486         -291.557         -3681763           30         -261724         -410000         -204.5881         -252.03         -261109           31         -261724         -410000         -204.5881         -291.555         -985.246           31         -261729         -410000         -270.398         -271.556         -985.246           32         -261724         -270.398         -271.097         -250.888         -271.556         -26187<	2	.254635	-47.8328	716607.	-63.0147	.258526	-74.4104	.253114	-84-1017
25	2	·808050	-100.109	.947603	-<10.012-	.912006	-229.619	.645463	746.057
27	2	.235783	-276.24+	.35777+	-328.607	.398812	-5.22567	.413805	-30.3229
26	7	.254967	45.3377	.272369	100.9400	.261916	-72.503+	\$77753.	-82.3016
29	7	.>2260	-184.159	.014790	10.340	.614209	-233.974	.584048	-253.308
29	2	.390272	-243.092	.307442	-286.371	.192475	-3.55.038	151292	-28.9570
31	2	.260600	-43.1023	.274548	-59.2116	•264406	-70.9003	.26110*	-80.8465
31	7	1+7+95.	-167.704	.410604	-204.542	.403564	-233.857	.387763	-257.568
22	<b>m</b>	.555193	-241.753	141174.	-272.310	.238485	-291.555		
34 .504481 -1464-60 .55039 -184.881 .252038 -226.108 .234407 .350458 .256108 .234407 .236450 .2651327 .350458 .256193 .266192 .265192 .2503854 .266192 .2651929 .2503854 .2661929 .2651929 .2651929 .2651929 .2651929 .2651929 .2651929 .2651929 .2651929 .2651929 .2651929 .2651929 .2651929 .2651929 .2651837 .2651837 .2651837 .2651837 .2651837 .2651837 .2651837 .2651837 .2651837 .2651839 .265483 .2651839 .26518	7	.261424	-41.0570	.276159	-57.7197	.265898	-69.5021	.263181	-79.4735
34	9	4	-140.400	160007.	-189.881	.252658	-226.108	104487	-256.858
25	7	٦.	-240.006	.540398	-471.377	.358550	-283.270	.230858	-583.594
37 - 314525 - 1274-72 - 120-004 - 100094 - 202-705 - 117765 - 1177		476197	17.13.14	414917	-56.3960	.266193	-68.2443	.263882	-78.1929
26 (26135) - (251.857		.314635	-121.452	.237363	-100.001-	.160694	-202-105	.117765	-242.253
26 .261849 -31.2120 -25.1819 .2629038 -67.0733 .264972		./81130	-251.837	.645051	-274.759	.468743	-285.425	.350658	-288.073
29 .357612 -115.011 .250559 -144.883 .148932 -104.921 .751194E 40 .3661605 -257.540 .72795 -274.575 .563707 -290.083 .453305 41 .144175 -53.6150 .214529 -47.4542 .214677 -57.5752 .21134 42 .516114 -112.720 .446370 -137.221 .561119 -151.356 .310446 43 1.01.565 -34.554 .917.385 -354.746 .767652 -347.557 .074030 17.855407 -00.0050 1.74032 -75.246 1.87680 -93.3307 1.874.38	7	.201087	-37.2720	.276560	-55.1819	.265038	-67.0733	.262972	-76.9600
40 .801003 -257.540 .727930 -279.375 .503707 -290.083 41 .194175 -53.0150 .214529 -47.4392 .214677 -57.5732 42 .510114 -112.720 .440370 -137.221 .301119 -151.356 43 1.01.55 -503.54 .947385 -350.746 .767652 -347.557 8/P3 7 7.45715 -154.452 9.28913 10.3451 -157.563 1/P3 7 1.55407 -00.0000 1.74032 -75.2460 1.87080 -93.3307	1	.13766.	-115.611	.250559	-144.883	.148932	-104.921	.75119+E-0	1 -181.544
41 .194175 -53.6150 .214529 -47.4392 .214677 -57.5752 42 .516114 -112.726 .446370 -137.221 .501119 -151.356 43 1.01.55 -500.564 .9417385 -350.746 .767652 -347.557 8/P3 7 7.45415 -154.452 9.28911 -157.863 1.87686 -93.3307 1/P3 7 1.55407 -00.0500 1.74032 -75.2486 1.87080 -93.3307	1	.861605	0+5-167-	.127930	-219.375	.563707	-290.083	.453305	-294.822
45 1.01265 -112.720 -440.370 -137.221 .501119 -151.356 45 1.01265 -303.564 .717385 -350.746 .767652 -347.557 87.73 7 7.85415 -154.452 9.28911 -144.693 10.3451 -157.863 17.75 7 1.55407 -00.0000 1.74032 -75.2480 1.87080 -93.3307		41441.5	-33.6150	-514524	-47.4392	. 14677	-57.5732	.241134	-00.4000
43 1.01.562 -347.557 -350.746 .767652 -347.557 -350.746 .767652 -347.557 -1.55493 -1.55407 -0.0.000 1.74032 -75.2480 1.57080 -93.3307		+11016.	-117.720	.440370	-137.221	.301119	-151.356	.310448	-100.557
1/P3 7 1.55407 -00.050 1.74032 -75.2466 1.67060 -43.3307		1.01365	-202.204	5851140	-350.746	.767652	-347.557	.074030	-359.658
1/75 1.555401 -00.0650 1.74032 -75.2466 1.67060 -43.3307		0	-134.436	4.28911	-144.693	10.3431	-157.863	10.5461	-172.217
		2	0000-00-	1 7.033	3. 3				

RUMOLE MUDEL WITH SHIRL AUGMENTUR AND PROXIMATE FLOW SPLITTER USING EMPIRICAL COMPUSTION DATA

I CASE Y	* KUMULE	RUMULE SEIRL#FRUKIMAI	CUNICA = 60.00 HERIT FERTHER FRENCHOL* EVI CAVE	FREEDINGY =	ob.vo HERTA	FREDUENCY	= 70.00 HERTZ	FREGUENLY	= 75.00 HER12
PAKAMTEK	10 NO.	CAIN	PHASE ANGLE	GAIN	PHASE ANGLE	GAIN	PHASE ANGLE	GAIN	PHASE ANGLE
	-	.417105	110.142-	.309060	-209.576	.349975	764.045-	.346088	-314.604
٧١	2	.+17162	-07.0700	.364060	-84.5780	.344475	-110.457	.340088	-134.004
K1	•	cu171+.	-247.071	.309000	-209.576	.349975	-290.457	.346088	-314.604
P2	+	.347754	-141.057	.3+301+	-214.454	.318215	-230.018	.307590	-248-613
V2	^	1.78002	1-230.047	1.00418	-324.304	1.04907	-16.3800	1.69371	-40.701-
RZ	0	.437616	-150.773	. 351049	-263.747	.281760	-244.332	.221809	-263.061
6.9	7	.238517	-110.149	.236048	-123.338	.253245	-131.898	.281261	-146.007
V3	o	2.34477	-301.678	2.05045	-318.157	1.87098	-352.935	1.79595	-350.319
R3	•	.279900	-144.215	.143950	-165.026	.100083	-126.598	197657	-130.129
P3H	10	.259134	-110.641	.253810	-124.813	.268773	-153.781	.294653	-148.028
VSH	11	308008	-400.000	676908.	-275.067	.336641	-282.355	.374544	-295.019
KOH	17	.239967	-14.4.47	. 231835	-138.390	.241861	-148.277	.261066	-105.409
PZH	13	.265554	-125.773	.261190	-134.505	.277867	-144.238	.300346	-159.253
NZH.	14	.205534	-365.773	061197	-314.505	.277807	-324.236	.306346	-339.253
RZH	15	.265534	-125.773	.261190	-134.505	198772.	-1+4.238	.300346	-159.255
NIC	10	1.00000	-360.000	1.00000	-360.000	1.00000	-360.000	1.00000	-360.000
5	17	5.09479	-298.292	1.92314	-310.219	1.80183	-334.345	1.64989	-354.755
MON	18	155005.	-217.751	264212.	-440.613	.241946	-230.468	.283905	145.165-
TOOL	19	1.06765	-289.430	.960933	-305.624	.879142	-341.244	947681.	-557.852
4.d	20	.201999	-110.400	.250061	-124.467	.271842	-133.345	.298278	-147.364
**	2.1	+10+19.	-269.665	.601191	-301.359	.576187	-311.181	107876.	-324.046
R4	22	.133626	-288.245	.135003	-324.464	.140294	-7.10007	.142343	-53.4423
50	25	.245279	-93.7529	.241554	-101.611	.252825	-110.464	.270890	-124.308
15	47	.742461	-258.141	.608871	-204.115	.667783	-208.457	.716158	-276.937
52	25	.438562	-51.4410	.400344	-72.8659	.485220	-96.0902	.472980	-121.487
90	20	.249581	-42.4507	.244077	0648.64-	.254794	-107.781	.474854	-1.00.490
16	23	.523787	-268.420	.475933	-270.049	840184.	-279.975	1927467	-207.795
98	28	.195432	-79.4392	.280204	-115.623	.373198	-144.764	274444.	-171.952
10	24	.252312	-90.8588	.245341	1646.76-	.256522	-104.832	.280059	-116.464
11	30	.350464	-270.335	.315614	-245.442	.329939	-267.588	170704.	-493.844
27	31	.495012E-U		655202.	-171,190	.351903	-190.359	.472556	-212-162
98	32	.253737	-89.4412	147645.	-95.9343	.259459	-101-129	749097.	-114.417
V8	35	.207299	-281.826	.178265	-272.707	.190867	-269.695	.269989	-243.676
88	34	.147057	-255.455	. 230535	-223.214	.387001	-227.442	.527744	-243.73>
60	35	.253790	•	.245250		.260472	-98.5585	.294782	-108.617
61	30	.861990E-01	'	. 503676E-01	1 -296.298	u	-01 -272-269	.150880	-479.540
64	37	.263840	-270.792	.306382	-250.059	.449937	-255.532	597645	-268.810
P10	38	.452260	-86.6436	.243585	-91.0302			1010000	-104.944
V10	34	.259647c-01	•	**52469E-01		.729222E-0		.112725	-232.791
R10	04	.366639	-296.165	.391720	-217.419	.524664	-276.931	.676027	-289.020
P11	41	.216432	-76.0429	+16102.	-82.9233	.200825	-64.137>	.422965	-87.0655
111	45	+25572*	-164.381	165262.	-104.114	.364036	-171.572	.445130	-109.143
K11	45	.583324	-0.14104	.508732	-3.92714	.746569	-7.16182	.909773	-24.1304
	0/60	7 4.65159	-185.129	8.00050	-194.819	7.40701	-201.035	6.38534	-204.232
P1	1/23	11.140/4	-130.921	1.56550	-146.240	1.38196	-158.559	1.22048	-108.518
	1/73	404106.	-320.691	.655343	-319.585	. 193009	-312.240	.792734	-300.974

RUMBLE MODEL WITH SWINL AUGMENTUR AND PRUXIMATE FLOW SPLITTER USING EMPIRICAL COMBUSTION DATA

Name	1	A NOMOLE	CASE Y NOTICE SAINETTRONING	EQUENCY = 80.00 HEXIZ FREQUENCY = 0.0 H	FREGUENCY	= 0.0 HERTZ	FREQUENCY	= 0.0 HERT2	FREQUENCY =	0.0	HEK TZ
1   3.25   2.5	4	ER ID NO.	GAIN		NIAS		GAIN			PHASE	ANGLE
1   2   2.2.6.24   1.0.2.10%   1.0.2.10%   1.0.2.10%   1.0.2.10%   1.0.2.10%   1.0.2.21%   1.0.2.2.2%   1.0.2.21	PI	1	.324024		0.	3.	0.	0.	0.	0.	
No.   1,250,254   1,241,1996   1,999	٧1	2	.324024		0.	0.	0.	0.	0.		
No.   100	K1	2	.329624	-346.098	0.	0.	0.	0.	0.	0.	
No.   1009414   -26,5384   .	P2	*	.286624		0.	0.	0.	0.	0.	٥.	
No.    Ve	1	1.00414		0.	0.	0.	0.	0.	•		
P3	RZ	9	.169973			0.	0.	0.	0.	•	
No.	P3	7	.296210	-165.321	0.	0.	0.	0.	0.	•	
Part   11   1.00   1.	٧3	æ	1.02587	-10.2271	0.	0.	0.	9.	0.	•	
PSH 110	2	5	.252172	-165.795	3.	0.	0.	0.	0.	0.	
Nat	PSH	10	.307639	-167.089	0.	0.	0.	0.	3.	0.	
Rah 1122238	VSH	11	c1c704.	-314.592	0.	0.	0.	0.	0.	0.	
PRH         13         -221389         -175.066         .0         .0           RATH         14         -321389         -175.066         .0         .0         .0           RATH         15         -121389         -175.066         .0	RSH	12	.267710	-185.319	0.	0.	0.	0.	0.	0.	
WRH         11         -321389         -359,088         .0         .0           QRM         15         -121389         -359,088         .0         .0         .0           QRM         16         14,00000         -201,025         .0	PZH	13	.521389	-175.068	0.	0.	0.	0.	0.	0.	
Nat	VZh	1,4	.321389	-354.088	0.	0.	0.	0.	0.	0.	
Mail   10   1.00000   250.000   0   0   0   0   0   0   0   0	RZH	15	.321289	-179.388	0.	0.	0.	0.	0.	0.	
M3	OIN	16	1.00000	-300.000	0.	0.	0.	0.	0.	0.	
MSH         18         -271.522         .0         .0           P4         21         -578.52         -577.13         .0         .0           V4         21         -578.52         -357.71         .0         .0         .0           V4         21         -578.59         -14.17         .0         .0         .0         .0           P5         22         -72.037         -14.610         .0         .0         .0         .0         .0           P5         24         -72.0473         -44.615         .0	M3	17	1.40+55		0.	0.	0.	0.	0	0.	
14	MSH	81	.315458		0.	0.	0.	0.	0		
P4 22	TOO	17	.678562	1	0.	3.	0.	0.	0.	0.	
V4         21         .553905         -340.174         .0         .0           P5         22         .127597         -99.0119         .0         .0         .0           V5         24         .754073         .0         .0         .0         .0         .0           P6         25         .746073         .147.576         .0	t	20	.311329	-100.594		0.	0.	0.	0.	0.	
R4         22         .127557         -99.0119		17	4563405		0.	0.	0.	0.	0.		
24		22	127557		2.	0.	0.	0.	0.	0.	
25	. P5	57	.273037		0.	0.	•	0.	0.	0.	
25	45	54	.754073	-250.275	0.	0.	0.	0.	0.	0.	
26	RS	25	.419431	-145.370	0.	0.	0.	0.	0.	0.	
27	9 d	97	.280919	-457.770	0.	0.	0.	0.	0.	0.	
26	94	27	.033092	-301.453	0.	9.	0.	0.	0.	•	
29	R6	97	.463329	-195.756		0.	0.	0.	0.	?	
31 .501575 -507882 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0	P7	52	.296592	-154.915	0.	0.	0.	0.	0.	9.	
31 .52736c .232.995 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0	77	30	478104.	-307.882	0.	0.	0.	9.	0.	٥.	
35 .3.2272	R7	31	.527360	-232.995	0.	0.	0.	0.	0.	0.	
35 .371477 .309.250 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0	84	32	.302720	-120.317	0.	0.	0.	0.	0.	9.	
34 .317126 .262.3334 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0	8	33	.3/18//	-309.250	0.	0.	0.	0.	0.	0.	
34 .255.24 .202.620 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0	200	45	144660	-262.330		0.	0.	0.	0.	2.	
37 .0755296 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0		20	071/150	-124.140			0.		0.	•	
36	5	20	845657	-302.620	0.	0.	0.	0.	0.	•	
34 .134491 -280.672 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0	24	31	7109/0.	-286.198	0.	0.	0.	0.	0.	•	
40 .74491 .280.072 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0	25	20	.332126	-120.395		•	0.	0.	0.	•	
40 . 753866 - 305,919 . 0 . 0 . 0 . 0 . 0 . 0 . 0 . 0 . 0 .	010	34	1644/1.	-280-012	2.	0.	0.	0.	0.	•	
41	KIO	4.0	.163866	-305.919	0.	0.	0.	0.	0.	?	
42 1.12576 -43.0433 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0	PII	1,	\$56997	-95.5185	0.	0.	0.	0.	0.	•	
43 1.12576 -43.0433 .9 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0	111	745	.476900		0.	0.	9.	0.	0.	•	
87P3 7 5-48890 -204-500 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .	RII	43	1.12576		0.	0.	0.	0.	0.	0.	
1/P3 7 1:11261 -176.777 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0	V3	8/83	7 5.48890		0.	0.	0.	0.	0.	•	
41/83 7 .840402 -290,198 .0	PI	1/23	7 1.11281	-176.777	0.	0.	0.	0.	0.	0.	
0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0	P11	41/P3	7 .840402	-290.198	0.	0.	0.	0.	0.	0.	

RUMBLE MODEL WITH SWINE AUGNEWTON AND PROXIMATE FLOW SPLITTEN USING EMPIRICAL COMBUSTION DATA

1 CASE 9	9 RUMBLE	FRED	UENCY = 90.00 HERTZ FREQUENCY = 100.00 H	FRELUENCY	=100.00 HERTZ	FREDUENCY	=110.00 HERTL	FRELCENCY =1.	FREQUENCY =120.00 HEK12
PAKAMTER	ID NO.	0	PHASE ANGLE		PHASE ANGLE	GAIN	PHASE ANGLE	GAIN	PHASE ANGLE
	-	.270948	-36.3449	·18+509	5355-19-	.128666	-152.437	.952850E-01	-440.538
V1	7	.270946	-218.345	.184509	-277.535	.128006	-332.437	.952650E-01	
R1	.0	~	4440-80-	·104504	-47.5352	.128666	-152.437	·*>2850E-01	
P2	+	.227193	-314.414	.152165	857364	.106060	-42.1071	.800000±-01	0010.04-
٧2	2	1.43001	-119.557	174544.	-175.051	*65460*	-227.484	.503702	-292.406
RZ	٥		-291.350	.109020	-243.655	.134433	-44.2555	.868033E-01	
P3	7		-206-170	.2061+0	-256.127	.143998	-300.385	.995717E-01	
٧3	æ	1.18892	4790.84-	. 738800	-64.0622	.513899	-113.172	.415740	-157.834
R3	,	.1+5075	-221.172	151365	C40.877-	.161784	-299.953	.750470E-01	
РЗН	10	.290031	-204.444	.211159	-257.111	.147068	-300.809	•102266	-357.147
УЗН	11	.40000	-354.491	.31+085	-37.5440	.232256	-79.2077	•171556	-133.775
83н	12	544705	-421.495	110901.	-270.255	.111934	-321.058	.735679E-01	-18.1472
Р2Н	15	.306514	-423.034	111977	-274.243	.159807	-217.560	.112935	-15.5474
VZH	14	.306514	-43.0540	711622.	-42.2434	159807	-137.566	.112933	-195.247
RZH	15	.506514	-223.054	.226117	-272.243	.159807	-317.566	.112933	-15.5474
OIN	16	1.00000	-360.000	1.00000	-360.000	1.00000	-360.000	1.00000	-360.000
W3	1.1	1.0+108	-+9.0095	.022717	-42.2579	.353763	-110.076	.371220	-149.013
HOM	16	.335260	-315.005	.208494	1+066-4-	.204815	-50.3954	.15+07+	-108.380
000T	19	.266380	-19.6300	JE8085.	1690.16-	.298223	-80.5527	.291958	-132.344
P4	20	785665.	-206.434	.213304	-230.498	.149034	-300.138	.103697	-350.420
**	21	154744.	-14.3062	.308924	-53.6005	.277130	-90.5607	.215508	-142.382
K4	22	.819363E-01	01 -164.470	-760505E-	-01 -220.623	10-3415470.		.38>423E-01	-25.3101
P5	23	.238027	-184.352	.157125	-225-619	-981169E-01		.613545E-01	
45	54	.764820	-325.299	.013007	-4.54319	+0060+	-44.0229	.355333	-97.6148
R5	25	047645.	-187.000	. 210913	-243.301	.114566	-272.087	.108011	-327.008
P6	97	+66847.	-174.655	.171316	-412.670	.111810	-241.914	.707567E-01	-274.417
Vo	2.1	.741501	-334.431	.705035	-15.1579	.022101	-45.0741	.507209	-80.3477
R6	28	779594.	-231.303	.343883	-207.531	.236219	-273.039	.181058	
14	56	194507.	-167.430	194192	-201.961	.136858	-226.674	.973657E-01	•
77	30	.662106	-341.082	.704066	-20.4836	.673009	-50.7563	.606620	-61.5279
K/	31	.155cJJ	-204.103	.435348	-296.070	.321223	-300.620	.276673	-303.673
מ	70	.280903	-161.154	944677.	-195.857	.100750	-210.583	.131850	-240.085
84	55	540000	-345.524	116140.	0664.62-	791900	-56.3309	.630245	-62.8465
KG	34	.63/632	-292.181	.512908	-353.062	.383853	-329.947	. 331977	-336.456
64	35	.511704	-155.963	442947	-188.011	-503804	1204.444	.109453	-732.924
60	30	445005	-345.472	.561481	-29.3078	.592570	-60.8214	.598720	-90.4813
64	27	.124458	-310.020	068266.	-3+7.307	.447330	-357.719	.374823	-2.12785
P10	36	+08760.	-151.761	· < >00085	-103.832	.239672	-205.618	.207617	-228.405
V10	65	.33+659	+57.655-	1400327	-20.1474	.500621	-6018.09-	.529089	-94.2751
R10	24	.814231	-336.850	.681202	-0.40105	.523328	-22.4143	.427403	-30.4543
PII	1,	.283705	-114.203	.30338¥	-136.254	.301814	-157.249	.301555	-176.053
VII	7.4	.514353	-254.564	. +20107	-290.139	.320767	-325.749	.257487	-349.049
	24	1.250+3	-62.0540	1.13009	-123.437	.939220	-149.422	.813862	-172.593
	2/67	071777	504.441-	1.58424	-101.905	3.50878	-172.787	4.17520	-100.541
	1/2	00	-150.167	. 695005		.895521	-212.052	* 42004.	-443.245
1	11/15	1.00801	-200.007-	1.47176	-244.127	2.09596	-216.864	3.02052	-181.300

RUMBLE MUDEL WITH SAIRL AUGMENTUR AND PRUXIMATE FLOW SPLITTER USING EMPIRICAL COMBUSTION DATA

KUMUL										
1 CASE	,	SWI	NL*PNUX IMATE	*EMPERICAL*JP	RUMBLE SWINL*PRUXIMATE *EMPERICAL*JP4*TABEPLOT*TEST CASE	ST CASE				
			TRECOENCY = I	30.00 HEK 12	TRECOUNCY =1	=140.00 HEK 12	5	=150.00 HEKIZ	TRECOENCY	=160.00 HEK12
PANAMICA	TEX TO NO.		CAIN	PHASE ANGLE	CAIN	PHASE ANGLE	NTVS	PHASE ANGLE	NIVS	PHASE ANGLE
P.	-		.93+508E-01		134514	1-244.747	.248037	-36.4473	.448811	-131.346
~1	7		.93+503E-01	-104.722	.13+51+	-104.747	.248037	-218.947	.446877	-311.345
RI	2		.4345udE-UI	-264.724	.134514	1244.747	.246037	-38.9473	118877	-131.346
P2	+		.811561E-01	-150.081	.122025	-198.737	.235972	-242.450	·441384	-325.205
72	^		c40c7+.		.636604	-50.0084	1.06790	-100.360	1.70261	-108.302
RZ	0		.572942E-01		.715296E-01	•	.205335	-228.759	-+76117	-323.930
P3	7		10-7**67*8.	146.651	.985121E-01	-40.3621	.143228	-117.506	.239000	-172.573
V3	89		.+58431	-203.405	.72+290	-248.918	1.39632	-291.261	2.48790	-13.31.7
R3	*		.422470E-01		. 4635+9E-01	•	. +61911E-01	11 -114.735	.309038	-153.720
РЗН	10		.874099E-UI	47.8335	.103776	-89.7769	.155170	-117.850	.257973	-175.503
VSH	11		.156612		4146511	-223.665	.312173	-250.729	.551296	-307.617
R3H	12		.593794E-UI		.654348E-01		.909532E-01	126.761- 10	.139969	-193.795
РЗН	13		.987645E-01		8068TT-	-111.558	.181555	-141-405	.308057	676-007-
VZH	1.1		.9870+3E-UI		113908	-291.558	.181535	-321.405	150805.	-20.9289
RZH	17		. 78 7045L-UI	-07.9111	113906	-111.556	.181535	-1+1-+05	.308657	-200.929
CIN	10		1.00000		1.00000	000.000-	1.00000	-360.000	1.00000	-300.000
M3	17		.410040	-202.293	240440.	-245.816	1.35022	-291.143	2.25833	-16.3100
M3H	18		.143319	-160.695	.181453	-204-234	.289401	-233,681	150115.	-493.107
1000	15		.303660		1050++-	-452.672	.817858	-276.813	1.21919	-357.994
P.4	20		.891575E-01		.105371	-88.9385	.157674	-116.957	.262348	-174.617
**	77		.212+90		116167	-235.294	.489637	-271.387	.777800	-341.319
A 84	22		.445776E-01		.435684E-01		.139161	-296.243	.284928	-44.5621
2	23		.4963676-01	-346.455	.628431k-01		.114186	-33.7954	.211930	-90.1181
	77		.326291		.408546	-169.013	.612187	-218.737	.937108	-275.854
RS	55		.920008E-01	-36.0591	.110231	-90.3272	.194700	-162,305	229275.	-289.234
P6	97		10-11 60066.		.679770E-01		.125353	-9-15410	.224975	-14.9794
No	27		.405130		690055.	-144.977	.455559	-183.468	767109.	-260.309
R6	50		.154705	1.7	.233480	-252.16+	.457418	-263.00+	.656873	-333.790
14	67		.808332E-01		.840917E-61	-316.247	141097	-349.715	.227811	-65.8433
17	30		+80475.		195584.	-129.800	.528576	-157.585	.525580	-265.529
R7	31		.288302	-292.199	.407360	-293.475	.696145	-305.806	.960841	-6.04776
84	32		.113300	-204.200	.115564	-242.667	.158887	-332.042	.221857	-49.0314
8.4	33		.542105	•	.565453	-149.555	.633253	-151.326	.649100	-203.930
K8	34		.352230		C+806+.	-325.515	.810105	-337.482	1.14003	-32.9857
64	cr		.148750		1+8541	-280.053	.183720	-315,354	.221758	-29.0802
61	36		.571355		076516.	-134.411	0660990	-150.487	.761332	-195.563
68	37		.380239		116516.	-355.182	.842167	-5.5.993	1.20113	-57.3403
P10	35		.165674		.18+748	-271.803	.219235	-300.916	.240145	-0.69320
010	36		.515272		. >26208	-135.427	100819	-150.171	.802013	-191.090
RIO	0+		**04525		106510.	-24.9159	.813470	-32.8904	1.17635	-81.0292
P11	1+		.280524		. 283953	-212.040	.317037	-225.430	.370857	-262.509
111	74		.228400		506107.	-13.1817	.383303	-31.4872	.527054	-90.6685
R11	7		.730046		178787	-199.788	1.07760	-215.909	1.42934	-468.533
<b>×</b> 3	6/P3	1	5.41021		1.35224	-126.536	9.74892	-173.754	10.4007	-200.741
PI	1/P3	1	1.10287	-236.467	1.36246	-254.365	1.73176	-281.439	1.87762	-318.773
PII	41/73	-	3.36150	-147.740	2.88242	-121.658	2.21351	-107.922	1.57637	-89.9359

RUMBLE MUDEL AITH SMINE AUGMENTON AND PRUXIMATE FLUM SPELTTER USING EMPIRICAL COMBUSTION DATA

LASE	A KUMBLE SMI	FRE	NUNIMALE * EMPENICAL * UTAT * I NOT TENDE CANE	FRELORNO	FREQUENCY =100.00 HEN12	FREQUENCY	=150.00 HERIZ	FREQUENCY =	=200.00 HER 12
TMA	ER IU NU.	5		GAIN	PHASE ANGLE	GAIN	PHASE ANGLE	GAIN	PHASE ANGLE
	-	.34840+	-211.03	++7[+7.	~267.511	096517.	-514.855	.131,95	-10.3391
٧1	.7	*34840*	-31.0310	.241244	-67.5114	.215560	-134.853	.101293	-190.339
81	'n	.346404	-411.034	++71+7.	-207.511	.215500	-314.853	.181292	-10.3341
P2	1	.362580	-30.3534	416667.	-84.0016	.237933	-123.448	.203332	-171-253
72	^	1.14005	-203.032	.023717	-311,541	.+20879	-347.054	.253419	-21.8335
R2	0	+006000	-20.4500	6+0741.	-107.751	.122903	-132.592	.128474	-124.548
P3	1	718125.	-219.007	194997	604.767-	.2095+3	-284.313	.196778	-327.663
V3	٥	1.77454	-03,7663	1.031.5	-129.346	161589.	-103.983	.354934	106.141-
RS	,	.211046	1-258.207	.803238E-	-01 -223.861	.201043	-276.224	-17971-	-345.384
P3H	10	.230967	-422.982	.197764	-256.018	.204016	-287.046	195591.	-329.549
N3H	11	.52+263	-354.466	.470550	-27.0332	.534931	1158.75-	.530846	-100.256
ROH	12	.115968	-258.205	1	01 -200.903	.923616E-	-01 -292,187	.837438E-UI	1 -327.749
PZH	15	.285090	-250.214	671847.	-265.167	.270226	-318.208	+10002.	-2.79260
VZH	14	.263090	-70.4139	. 248729	-105.167	.270226	-138.209	+10002	-162.795
RZH	15	.283090	-250.214	427842.	-265.167	.270226	-318.208	·10097.	-2.79200
CIN	16	1.00000	1360.000	1.00000	-300.000	1.00000	-360.000	1.00000	-300.000
M3	17	1.56459	-84.5624	1.02826	-133.812	*68670*	-160.903	.25+111	-213.797
M3H	10	507+9+	-342.01+	c001c+.	-10.5030	.486941	-48.9624	.478259	-92.8397
TUDE	51	.755727	4002.46-	.407298	190.0367	.303561	-96.1605	.350240	-110.013
<b>*</b>	20	.233089	-421.932	114107.	-254.905	4415125	-285.940	.199455	-328.391
77	71	.550042	-32.3007	. 3980+2	-55.3401	.421734	-75.1516	.431744	-109.171
**	22	.224489	-122.223	.225580	-173.978	.228751	-234.036	167057	-200.80>
PS	23	.164919	-147.536	.111434	-175.456	.101631	-100.602	.981014E-0	_
45	5+	.784377		.643334	-346.627	.760796	-4.58154	.728540	-49.2475
RS	53	*514744		.234833	-65.4000	•239556	-1+0.168	.183166	-195.647
96	97	.171140		.141505	-155.945	.129215	-103.487	.140045	-188.500
94	7.7	.529613		.497158	-349.770	.596277	-10.0051	7240400	-54.3391
R6	28	.334571		.101857	-63.7459	L	-01 -255-135	.133300	-288.727
P7	5.2	.165028	-117.803	.126997	-137.494	.152854	-148.525	.183502	-117.51>
77	30	.327705	-285-592	.245124	-335.940	.315028	-11.3487	191546.	-54.5125
R7	31	.540115	144.0451	.256257	-48.8888	.282999	-28.2903	144685.	-+0.6255
Pa	20	198014	-101.528	.120263	-141.794	+16501.	-130.057	.203279	-108.050
48	33	*284234	-244.015	009007.	-270.831	160061.	-209.021	12,850	-20.4058
RB	34	.712872	165.8957	400000	7601.99-	.561159	-68.1109	004785.	-91.0337
49	35	.149556	-79.5141	.123230	-101.904	.167011	-122,070	.204001	-158.457
61	36	201426.	-230.542	0+2566.	-247.752	.311983	-266.478	.227417	-291.290
89	37	.8123+7	-87.0479	.614348	-91.7879	.761922	-97.1765	.818399	-175.002
PIC	38	.159482		159971.	-77.0950	.105743	-103.7+0	.192524	-143.759
010	3.5	*600lo*		186604.	-67.447-	077+++	-200.591	.403001	-202.223
K10	0+	.840560		C6+600.	-114.638	.802550	-177.581	.95,020	-147.701
PII	+1	.285621		.217064	-305.764	.210246	-317.579	.200074	-334.091
111	45	.3585/0		954707.	-140.445	.350523	-100.700	.384302	-195.300
KII	4	.993734	1304-482	. 775109	-318.930	.898211	-325.426	. 424327	-7.11247
43	6/73	100001	-424.095	2.28954	-230.906	3.26993	-239.669	1.77550	-230.304
PI	1/62	7 1.57694	-354.240	1.25717	-15.0718	1.02872	-30.5391	.92131+	-42.0158
PII	41/13	7 1.28764	-72.7604	1.11310	-53.3250	1.00336	-33.2054	1.02084	-0.45190

NUMBLE MUDEL WITH SWIRL AUGMENTOR AND PRUXIMATE FLOW SPLITTER USING EMPIRICAL COMBUSTION DATA

RUMBLE	RUMBLE COLORS		1		20 * 1 * 10 * 10 * 10 * 10 * 10 * 10 * 1	1347 13				
-	NOTOR A	FREGULNCY	NCY =2	MULNOY =210.00 HEK12	FRECCENCY	=220.00 HEN12	FRELUENCY =2	=230.00 HEKT.	PREQUENCY =	=240.00 HERTZ
PARAMTER	R IO NO.	NIAU		PHASE ANGLE		PHASE ANGLE	CAIN	PHASE ANGLE	GAIN	PHASE ANGLE
		.132055	55	-02.4006	.128586	-114.058	.138922	-104.478	.184800	-229.057
VI.	7	1154035	35	-242.401	.126506	-294.056	.138922	-344.476	.184600	-44.0574
RI	٦	.152055	55	-02.4000	.128588	-114.058	.138922	-104.478	.164606	-229.057
P2	1	.171510	10	-215.771	.144300	-254.904	.153052	-302.049	.199394	-359.307
V2	۸	.171621	171	-37.4912	.174050	-51.4310	.262841	-75.8106	.466118	-132.129
RZ	0	.152413	13	474-107-	.144833	-258.893	.137205	-314.930	.125979	-13.2811
P3	1	.171504	50	-8.42037	.140543	1449.64-	.130978	-86.3294	.152614	-137.888
V3	n	.171500	00	-192.576	145665.	-101.751	.424469	-208.899	.772140	-260.318
RS	,	.108320	30	-347.005	.1+1886	-47.0081	.945391E-01	-110.569	.991526E-01	1 -118.283
P3H	10	.109034	34	-10.2325	.138663	-50.4083	.130084	-88.0589	.153176	-136.926
VSH	11	.490021	.21	-141.05	445305	-161.520	001744.	-219.046	.529333	-269.193
KSH	12	.73105+	10-349	8dc159	.0421026-01	1 -33.7765	.661006E-01	-002.007	.820522E-0]	1 -109.355
PZH	13	.233248	24	145.0407	671761.	0560.00-	166661.	-128.120	.233502	-179.518
VZH	1,4	.6330	24	149.527-	.197129	-206.095	144441.	-308.120	.233502	-35%.518
RZH	15	.233448	84	145.0407	.157129	0660.99-	146661.	-126.120	.233504	-174.518
NIC	10	1.000	00	-360.000	1.00000	-360.000	1.00000	-360.000	1,00000	-360,000
N.S	17	4000.	10-201	-44.354	.170410	-145.018	.421788	-196.084	+99960.	-555.29*
MOH	10	.4363	740	-134.834	.374160	-170.403	.384190	-215.390	461054.	-205.613
TOOR	15	.3050	26	-141.560	. 364806	-109.404	.519211	-207.819	.715624	-260.100
* d	50	.1735	53	-4.02184	.1+2127	-49.1455	.139453	-86.7443	.157202	-135.561
44	17	1024.	17	-144.576	347586.	-161.567	.442840	-217.736	.574624	-266.993
R+	22	.1+70	10	-330.436	.123587	-30.0746	.877704E-01	-80.1436	.723866E-0	1 -141.964
P5	57	+001.	50.	-232.407	.100979	-201.581	.122284	-292.435	.169551	-337.974
42	47	1000.	09	-67.5639	0.916.	-125.453	7741640	-100.679	.538413	-200.648
RS	52	.1667	124	-240.790	.997037E-U	1 -284.153	.105790	-298.960	.171445	-336.009
P6	20	11577	181	-210.400	.158219	100.042-	178797	-276.673	.221348	-320.526
94	27	.020.	610	-63.5417	201166.	-110.08%	.514874	-132.304	7008840	-159.001
R6	28	.1784	58	-305.334	.174983	-306.835	.282209	-309.413	.391327	-337.306
P7	5.3	.201382	284	-207.085	014007.	-237.515	.220319	-265.537	.258083	-306-130
77	20	1774.	187	-80.0955	.412956	-112.743	.420306	-126.579	004184.	-145.550
R7	31	1045.	76	-55.8519	.156561.	-53.0844	.208289	-21.2900	.11646.	-20.2598
84	3.5	14220	77	-199.635	61,46220	-224.927	.243659	-250.082	c+6617.	-293.380
٧٥	33	.1375	285	-73.8655	.155096	-107.120	.181372	-114.005	.307260	-125.261
RS	34	.5278	040	-11:0000	141546.	-126.533	.321379	-123.252	.326616	-121-342
64	35	0522.	.00	-191-1+3	.223739	-241.650	.243968	-246.584	.280575	-281.277
51	36	1705	++	-311.182	.144770	-332.60+	.17+193	-6.72924	.263163	-05.1604
89	37	.7860	134	-140.525	9026000	-101.857	166400.	-109.889	.599480	-183.088
P10	38	.2008	100	-170.570	.202897	-208.807	.221063	-234.237	056557	141.197-
V10	34	.3824	503	-302.589	.303524	-524.378	.401965	-349.703	446004.	-30.5148
R10	0 *	+0+6·	991	-169.796	.639462	-104.017	.819884	-200.017	806198	-210.735
P11	4.1	+L02.	47.	-350.805	.213073	-10.6243	.240043	-32.0102	.293261	-61.7505
111	42	.3807	50	-220.017	.336438	-255.292	.328602	-274.492	.353920	-298.605
811	110	7468.	00	-25.7235	.187754	-01.1440	.803427	-78.7937	.921400	-104.314
N3	0/10	7 1.00255	150	-183.657	1.67420	-131.900	3.10245	-120.509	2.0540	-122.430
P1	1/19	0000088.	000	-53.4802	. 914935	-64.2140	1.01419	-70.1484	1.21095	-91.1694
	+1/F3	1 1.209	111	-341.945	1.51007	-520.780	1.80000	-304.281	1.92159	-289.868

NUMBLE MUGEL WITH SWIRL AUGMENTUR AND PROAIMATE FLUM SPLITTER USING EMPIRICAL COMBUSTION DATA

HEKIL	ANGLE																																															
0.0	-	3.	0.		0				3.	2.	2.	2.	2.	0.	3.	2.	0.		0.	0.	3.	0.		0.	9.	0.	?	9.	0.	0.	?	0.	0.	0.	?.			0.	0.	0.	0.	0.	0.	2.	0.	0.	0.	0.
TATECOTNEY	CAIN	0.	0.		0.				0.	0.	0.	٥.	0.	0.	0.		0.	0.	0.	0.	0.	0.	2.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.		0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
HEK I Z	ANGLE																																															
0.0	7		2				0.		0.	0.		0.	0.	9.	0.	0.	?	0.	0.	0.	0.	).	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	9.	0.		0.	0.	0.	0.	0.	0.	0.	0.	0.		0.
Y ON THE STATE OF		0-					0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	٥.	0.	0.	0.	2.	0.	0.	0.	.0.	0.	0.	0.	?.	9.	0.	0.	0.	0.
15E H: K 17																																																
2	47.40						2.	0.	?	0.	0.	0.	0.	0.	0.	0.	0.	2.	0.	3.	0.	0.	3.	0.	0.		0.	0.	0.		٦.	0.	0.	0.		0.	٥.	0.	0.	0.	0.	0.	0.	0.	0.	0.		0.
1*10.0 14++	TAL DENC						0.	0.	2.	0.	0.	0.	0.	?	0.	0.	0.	0.	0.	9.	0.	2.		7.	0.	0.	0.	0.	0.		0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NOXIGATE REMPENICAL OPERIAL	PERSON MENT	TIMOR MINELL	10000	120.22	166.010-	+0004-21-	-200.231	-55.1443	-198.234	-331.824	-411.494	-196.530	-369.057	-165.657	-241.791	-01.7914	-241.771	-360.000	-364.743	-326.577	-325.526	-195.120	-350.082	-250.610	778.46-	-402.094	-32.4024	-20.8024	-154.014	-41.6402	-5.00719	-172.400	-60.1082	-345.274	-159.400	-129.77+	-260.250	-128.436	066.007-	-516.477	140.040	-240.123	-116.505	464.676-	462.141-	-155.590	157.511-	-280.350
SAINL*PROXIMALE			25.05.20	001047	001047	441007.	.175613	.137603	.100315	1.23580	.105792	.164520	.003946	.982025E-C1	.260018	.200010	260010	1.00000	1,16092	.510321	.493020	.109123	78.0c7.	.0032392-01	.221031	.546077	.273737	.252555	.410156	.423020	607997.	.571160	.462565	.270033	.515177	146585.	.279545	.412115	.506555	.261560	0724940	.800350	119762.	+04676.	1.02500	7.70000	1.555565	1.85770
LE SAL		•0•																																												1	1.	,
y RUMBLE		1		,	2	t		0	1	o	5	3.0	11	14	13	14	15	10	17	10	7.1	20	21	77	23	54	25	50	1.7	78	67	30	31	32	33	70	25	26	37	20	34	4	4	74	43	8/F3	1/13	+1/P3
NUMBLE 1 LASE	C A M. A	TANA TANA			14	74	42	K2	P3	× 5 ×	X.	PJH	VSH	Kon	PZH	VEH	RZn	CIN	M3	W.SH	1007	1	44	R t	62	45	X.	P.6	No	Ro So	P7	77	R7	PB	Vo	K8	64	68	200	P10	VIO	K10	P11	V11	K11	· V.5	F1	F11

NUMBEL MUDEL WITH SMIRE AUSMENTON AND PROXIMATE FLOW SPELTTER USING EMPIRICAL COMBUSTION DATA

10 No.	ON		7144		O.O HEKIZ	- LOUIS A		HER12	FREDUENCY =		HERIZ
2746755735/L-01	-051	AIN	HASE ANGLE	GAIN		GAIN		ANGLE			ANGLE
274672 -190,002 -0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	~ ~ 1	.274075	5725676-01	٥.	2.	0.	0.		0.	?	
309033	. 7 #	-274675	-160.056		0.	0.	0.		0.	2.	
309622 -1900125 -01 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	*	.274075	575507E-01		0.	0.			0.	0.	
190993		.309053	500122t-01	0.	0.	0.	0.		0.	0.	
1909534006787-01 -0 -0 -0 -0 -0 -0 -0 -0 -0 -0 -0 -0 -0	^	.309855	-180.015		3.	0.	0.		0.	•	
30/852	3	.309053	0402432-01	0.	0.	0.	•		0.	٥.	
100953 -1700194-01 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	1	.205822	407407L-61			0.	0.		0.	?	
30965370c5194-011 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0	5	.309633	-175.973	0.	0.	9.	0.		0.		
309653401676-01 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0	,	.304633	780519E-01	0.	0.	0.	0.		0.	0.	
309653160.041	10	.305053	461167E-01	0.	0.	0.	0.		0.	0.	
309933493935-01 309953493935-01 309953493935-01 309953493935-01 1.00000 1.0000000 1.000000 1.00000000	11	.309833	-180.041	0.	0.	0.	0.		0.	•	
399933 -472935c-ul .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0	12	.309833	483093E-01		0.	0.			0.	•	
1.000000 - 181.040	1,5	.309655	10-3654674-01	0.	0.	0.	0.		0.	٥.	
1.00000 1.000000 1.000000 1.000000 1.000000 1.000000 1.000000 1.000000 1.00000000	14	200402.	-181.040	٠.	٠.	0.	0.		0.	0.	
1.00cute	15	.30465.	475935E- UL	0.	0.	0.	0.		0.		
.506491E-Co -90.0596 .403194EE-Co -90.0596 .3123447	10	1.00000	-366.000	0.		0	0.		0.	0	
. 403198E-04 -9400395	17	.568491E-U3	250-05-	,	0.	0.	0.		0.	0.	
3123846-03 -9600599	18	-40319BE-04	-90.0345	2.	0.	0.	0		0.		
312447460552E-U1  312447180.0cc  3124471180.0cc  31244711409E-U1  31244811409E-U1  312448 -	**	.312384E-02	-90.0569	0.	0.	0.	0.		0.		
.312947 -180.026	20	.312447	400555E-UI	2	0.	0.	0.		0.	0.	
312447712679E-01 -u .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0	21	146216.	-180.020		0.	0.	3.		0.	•	
.3124474414094-ul .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0	22	.312947	712679E-01	7.	0.	0.	0.		0.	0.	
312547 -180.015 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0	23	.312447	441404F-01	0.	0.	0.	0.		0.	•	
3127+7734818E-01 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0	5.4	.312547	-180.015	0.	0.	0.	0.		0.	•	
105594449697,-01 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0	25	.3125+7	739818E-01	2.	0.	0.	0.		0.	•	
105592 -166.047	20	0300000	10-17408+4-		0.	0.	0.		0.	?	
	17	.105592	-166.047	0.	0.	0.	0.		0.	0.	
300013  34155/E-01 -3595.663 .0 .0 .0  34155/E-01 -3595.663 .0 .0 .0  329536 E-01 -1795.65 .0 .0 .0  135716 -1595.70 .0 .0 .0  135716 -1795.02 .0 .0 .0  284305 -4795/Veb-01 .0 .0 .0  213718 -3595.991 .0 .0 .0 .0  27 8627 -1795.95 .0 .0 .0  27 8627 -1795.95 .0 .0 .0  27 8627 -1795.95 .0 .0 .0  27 8627 -1795.95 .0 .0 .0  27 8627 -1795.95 .0 .0 .0  27 8627 -1795.95 .0 .0 .0  27 8652 -1795.95 .0 .0 .0  27 8652 -1795.95 .0 .0 .0  27 8652 -1795.95 .0 .0 .0 .0  27 8652 -1795.95 .0 .0 .0 .0  27 8652 -1795.95 .0 .0 .0 .0 .0  27 8652 -1795.95 .0 .0 .0 .0 .0  27 8652 -1795.95 .0 .0 .0 .0 .0	28	.104483	220846	0.	0.	0.	0.		0.	?	
.34157F=01 -35%-663	54	.300013	456034E	0.	0.	0.	0.		0.	0.	
.34936#E-01 -179.335	36	.341557E-UI	-354.663	?.	0.	0.			0.	0.	
.292555	31	.349384€-01	-179.335	0.	0.	0.	0.		0.	0.	
135765 -155777	32	.292500	400583L-01	0.	٥.	0.			0.	9.	
.136716 -177.030 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0	23	1135705	174.465-	?	2.	0.	0.		0.	0.	
.284305 -477450E-01 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0	34	.136716	-179.030	0.	0.	9.	0.		0.	0.	
213418 -359,965 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0	35	.284305	47990bE-	0.	0.	0.	0.		?.	0.	
215190 -177-503 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0	36	.213418	-354.405	0.	0.	0.	0.		0.	0.	
.2768044935045-01 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0	37	.215190	-174.403	0.	0.	0.	0.		0.	٥.	
.276600 -359.991 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0	30	+64+170	+93303E-Ul	0.		0.	0.		0.	0.	
.2745627 -179.536 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0	55	.210806	144.465-	2.	0.	0.	0.		0.	0.	
.274484449574-61 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0	70	.278627	-179.536		0.	0.	0.		0.	0.	
27660c -359.999 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0	41	-274984	498579E-01	0.	0.	0.	0.		0.	3.	
7 1.00000 -179.920 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0	74	.27cbuc	-359.999	0.	0.	0.	0.		0.	0	
7 1.00000 -179.920 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0	43	.278621	-179.450	0.	3.	0.	0.		0.	0	
0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0	143	1.00000	-179.920	0.	0.	0.	0		0		
	103	.400524	1024011-01	17			2				
7 0007600	100		201110								

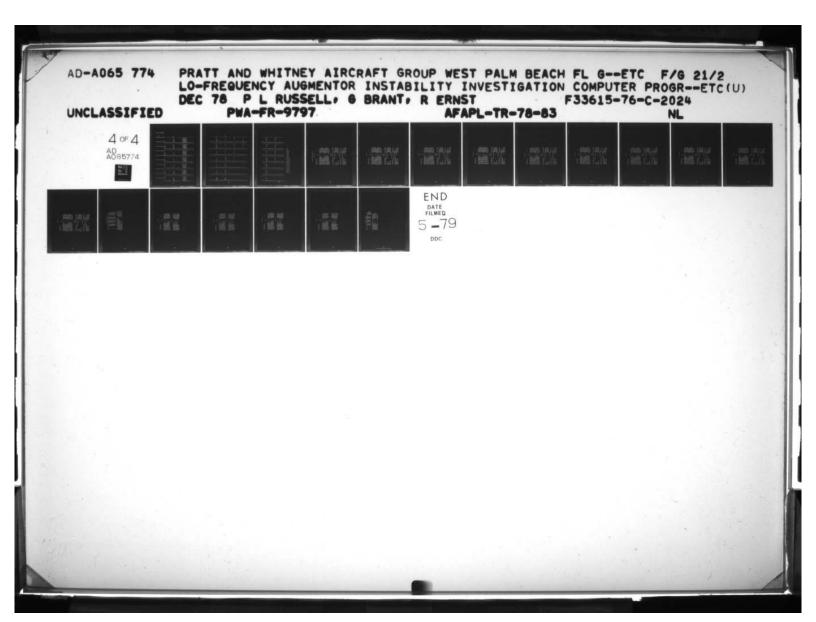
FLAMEHOLDER MODEL JNLY

CASE 11 F/H CUMBUSIIUN MODEL\*JP4\*FULL lab\*[ES] CASE

***	WAKNING	1	PAKAMLTER	BPR	16	. 59000	57	4	DEFAULT	VALUE
**	MAKNING	1	PAKAMETEK	JFUEL	11	1	15	4	DEFAULT	VALUE
***	WARNING	1	PAKAMETER	ALPHAC	ıŧ	000.00	13	4	DEFAULT	VALUE
***	WARNING	1	PARAMETER	ALPHAH	H	000.00	57	4	DEFAULT	VALUE
***	WARNING	1	PAKAME TER	EPSC	11	. 400000E-01	?	4	DEFAULT	VALUE
***	MARNING		PAKAMETER	EPSH	11	.+00000E-01	21	4	DEFAULT	VALUE
***	WAKNING	1	PARAMETER	FHMH	11	. 75000	13	4	DEFAULT	VALUE
***	WARNING	-1	PAKAML TEK	LSC	"	4.0000	15	4	DEFAULT	VALUE
***	MARNING	1	PAHAMETER	LSH	11	0.0000	15	4	DEFAULT	VALUE
***	WARNING	1	PARAMETER	NPRNIF	#	1	15	4	DEFAULT	VALUE
***	WARNING	1	PARAMETER	TEXT	11	0.	15	ø	DEFAULT	VALUE
***	WARNING	1	PARAMETER	TFSR	**	560.00	15	4	DEFAULT	VALUE
**	MAKNING	1	PANAMETER	WEAT	**	0.	31	4	DEFAULT	VALUE
***	MARNING	1	PARAMETER	YEC	11	00.000	17	1	DEFAULT	VALUE
***	MARNING	1	PAKAMETER	HIX	11	66-000	1	4	DEFAULT	VALLE

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		. 456000018E-01,	.37777771E-01.	.804804101E+57,	.745088561E+24,	1.05	•
840413608L-(1,	15/05/1695-1/6	249535448E+21,	3+7+39200E+22,	+86200839	022420775E-40,		
	.134017009E+01,	.015101009E-18;	-,444524113E+12;	54 (08509/E+22,	26/982192E+21,	t	677
- 1	- 34 76 78 742 F+22		4047771644447	26360763	.1340198091401		101
		. 504002605E+57.	-140703593E-19.	~-2558577550E+21.	621753559F+13.	- 267962755f +21.	
i	516982079 ,	799568692E-01,	68U570154E+70,	146214815E+22,	407242775	•	.02
	.025413887E+28,	.004449456E-50;	145751151E+14,	.447985030E+29,	.345660087E+67,		57,
	.497497531E+29,	.249909145E+29,	.511657301E+30,	118274944.	.254087761E+58,		,80
	.748259864E+19.	652443630.	.5110693916+30,	116275328.		•	180
	1410E+179	109388392L-od,	. 378461750E+27,	.44 7981 441E+29,			.67
	147425390E-48	424 (USISE +12)	3912000/8E+22;	1182/9016.	.101567525E+29,		.61
	- 309222000r+14-	177069707F+27 - FAHS		177134644404071	16713641606647	077.0	
115885007E+20,	. 398461950E+29.	-447981441E+29.	2	34	2524	7	10-31
		. 545950C15E+29.	.250134008E+29.	.131408861E+34.		. !	
	20910361-01,	008446c84£+57,	178077285E+22,	.083301380E-78,	290103917E+23,		22.
		002U89259E+24;	147155197£-57;	142379741E+26,	002076728E-57,		17.
1		214510004E-50,	24+30+123E+22,	~706456141E->6;	295812030E+22;	207634638E+21	:1,
2000143471431	236 44 4820 Lt + 66 ,	.061569206£+57,	.086607332E+66,	.745085350£+24,	.072027290E+57,		. 4.
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	.030429490E-59,	446408022E-38,	423329154E+22,	626736984	413568312L+22,	135059488.	
3086372L+29, 1		.54641J6J6L-71,	.153747415E-76,	231088704E+21,	+13847479E+22,	i	-
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THIS PROUGRAM CHECKS SPECIFIC INPUTS TO ENSURE REASONABLE INPUT DATA.

IF THESE CHECKS ARE NOT SATISFIED THE JOB WILL BE TERMINATED.

VIOLATIONS, IF ANY, WILL BE PRINTED BELOW-

# \*\* COMBUSTION MODEL RESULTS \*\*

		PSIA DEG R	DILESS	UPLESS	DOLESS	INCHES	D.LESS	DEG	DEG R	PSIA	INCHES	INCHES	DILESS	DILESS	DEG R				MICKONS	DILESS		D.LE	DILESS	DILESS	D.LESS	DOLESS	DEG R		FPS	DILESS		DEG R		DEG			LBM/SEC
1 2	_	15.0000	0.2500	00+0-0	0.0510	1.0500	0.2700	0000009	560.0000	250.0000	4.0000	000000	00.000	0.0	460.0000	660.0000	JP4	N.	89.5248	0.0	ON SOLUTION		0.9222	0.3036	0.2380	0.0581	3857.2183	DING	0.2384	2772.0	EFFICIENCY	2970.6990	0.5126	1522.3154	2182.8154	0.5205	0.0265
4 11	INPUT	" ()9	**	"	11	**	11	11	11		= (3	= (3	**	= 1	4	"		INJECTION		"	COMPUSITION	"	"	"	"	15	"	SPREADING	11			"	"			"	
STREAMTUSE TYPE		STATIC PRESSURE(PSO) #	PPRUAC			-	CKAGE	-	FUEL	FUEL	TO F/	2	BULENCE LEV	WAKE FLOW ADDITION (WEXT)	FLOW SOURCE TEMP (TEXT)		FUEL TYPE			FLASH VAPURIZATION	HAKE COM		BETA 2		7		WAKE TEMP	FLAME	INITIAL SPEED		STREAMIUBE	RISE	COMBUSTION EFFICIENCY	ACTUAL TEMP KISE		FLOWRATE - AIR	FLOWRATE - FUEL

		PSIA	DEG R	DILESS	D.LESS			DILES		DEG R	PSIA	INCHES	INCHES	DILESS		DEG R				MICOONE	DILESS	,	DILES	DILE	DILES	DOLES	DOLE	DEG R		FPS			DEG R		DEG	DEG K	LBM/	LBM/SEC
~~	-	15.0000	0000.019	0.2500	0.0450	0.0574	1.0500	0.2700	0000000	260.0000	250.0000	**0000	00000	0.0400	0.0	460.0000	670.0000	1P4	<u>.</u> 6	80 24.	0.0	UN SOLUTION	0.1960	0.9193	0.2842	0.2354	0.0623	3906.6753	DING	0.2559	2772.0	FICIENCY	3209.3884	0.5293	1698.7263	2368.7263	0.5163	0.0296
	INPUT		=17011=	= 139	"			"	* (D)		- SR1 =	11501 =	= (XFC) =	= (35	HEAT) =	* (1)		**	TOTTOO			COMPUSITION	"	"	"	"	*		FLAME SPREADING	"	,,	STREAMTUBE EFF				11	"	
SIKEAMIUGE TYPE		STATIC PRESSURE (PS6)	APPRUACH TEMPERATURE (TOC)=	APPROACH MACH NO. (MOC	KAI	EFFECTIVE F/A KATIU	I	CKAGE	APEX	S/R FUEL TEMPITESRI	ruel	F/H 015	174 10 NO22LE DIST. (XLC)	LEV	101	SUURC	ECTIVE	FUEL TYPE		ALAN DECIDE ET CIZE	FLASH VAPORIZATION	WAKE	BETA 1		BETA 3	K1	MAKE F/A	AKE		INITIAL SPEED		STRE	RISE	STION		EMP		1

		PSIA DEC R	0.LESS	INCHES D'LESS	DEG K	PSIA	D'LESS D'LESS	DEG R		MICKONS D'LESS	D. LE	D'LESS D'LESS	D.LESS DEG R	FPS 0.LESS	DEG K	DEG K	DEG R LBM/SEC	LBM/SEC
20	-	15.0000 670.0000 0.2560			560.0000	250.0000	0.0000	0034		89.5248	SOLUTION 0.1981		0.00+0	0.2471	EFFICIENCY 3390-6067	1758.9924		0.0359
	INPUT	1001=			" "	1 (3C) =	" " "		OUTPUT		COMPUSITION			E SPREADING	Ube.			"
STREAMTUBE TYPE		STATIC PRESSURE(PS6) APPROACH TEMPERATURE(TOC)= AFFRUACH MACH NACH NACH NACH NACH NACH NACH NACH N	PFECTIVE	WIDTH CKAGE	S/R FUEL TEMPTTESK)	33	TORBULENCE LEVEL (EPSC)	SOUR CTIVE TYPE		MEAN DRUPLET SIZE FLASH VAPORIZATION	DETA 1		MAKE F/A MAKE TEMP	FLAME INITIAL SPEED INITIAL TURBULANCE	STREAMTUBE	IN TEM	. 1	FLUWRATE - FUEL

								DOLESS						DOLESS								DOLESS	z	DOLESS	O.LESS				DEG R			J.LESS		DEG R		DEG		LBM	LIMISEC
**	5	15.0000	0000.000	0.2500	0.0500	0.0037	1.0500	6.2760	0000000	260.0000	250.0000	4.0000	00000	00000	0.0	460.0000	670.0000	JP4	1	NO	69.5248	0.0	ON SOLUTION		0.9193	0.2575	0.2353	0.0640	3986.2039	DING	0.2471	0.2772	EFF ICIENCY	3350.6067	0.5188	1756.9924	2428.9924	0.5161	0.0329
• •	INFUT	195	TEMPERATURE (TOC)=	NO.(M6C) =	# () #	. 01		" (30	PHAC! =	"	(PFSK) =	CE (15C) =	015T.(XLC) =	EPSC) =	N(WEXT) =	TEAT! =	EMP. =		DUTPUT	INJECTION	"	"	E COMPUSITION		"	"				FLAME SPREADING			UBE	"	INCY =	"		"	
STREAMTUBE TYPE		TATIL PRESSURE(PS6)		ACH MACH	RATIOLF	7	MIUTH	BLUCKAGE RATIOITAUC				F/H D1	TIE	14.5		SUUR	CLIVE INLET T	IYPE			NUNDEET SIZE	I VAPURIZ	WAKE		7 1							INITIAL TURBULANCE	STE	TEMP RISE	LIUM E	Ŧ			RATE - FUEL
STRE NO.		SIAIS	APP	APP	INPUT	EFF	1/1	9079	F	S/R	S/R	S/R	F/1	TORE	MAKE	FLOW	EFFEC	FUEL			MEAN	FLAS		OFIA	BETA	CLTA	KI	WAKE	WAKE		LINI	TINI		JUCAL	CUMB	ALTUAL	EXIT	FLUM	FLOM

		PSIA DEG K DILESS	J'LES D'LES		DEG R PSIA INCHES	D'LESS D'LESS DEG R	MICKONS D'LESS	O'LESS O'LESS O'LESS O'LESS	FPS O-LESS DEG R DEG R CEG R CEG R CEG R
20	17	15.0000	0.0450	1.0560	250.0000	0.000.004	10N 89.5248	10N SGLUTION 0.1980 0.9043 0.2673 0.2009 0.0707 3943.2703	SPREADING = 0.2446 = 0.3446 be efficiency = 3209.3884 = 1972.8440 = 1972.8440 = 2042.8440 = 2042.8440 = 2042.8440 = 2042.8440
STREAMTURE TYPE	INPUT	2	1 11	I	S/R FUEL TEMP(TFSN) = S/R FUEL PRESSURE(PFSR) = S/R FUEL PRESSURE(PFSR) = F/N TU MUZZLE GISL (KLC) =	TOKOULENCE LEVEL(EPSC) = MARE FLOW ADDITION(MEXT) = FLOW SOUNCE TEMP(TEXT) = EFFECTIVE INLET TEMP. = FUEL TYPE	UUTPUT  INJECTION  MEAN DRÜFLET SIZE  FLASH VAPUNIZATION  =	MAKE COMPOSITION  2 = = = = = = 5	SPEED FLAME SPR TURSULANCE =  IN KISE   IN FFICIENCY =  IN KISE   IN FFICIENCY =  IN FISE   IN FERSE   IN FERSE   IN FERSE   IN FERSE   IN FERSE   IN FERSE   IN FUEL   IN FUEL
STAEA NO. U		APPROACH	7 11	F/H WIDT DLUCKAGE F/H APEX	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	TURBU MARE FLOM FLOM FUEL FUEL	MEAN	DETA DETA OETA KA WAKE	INITIAL INITIAL JUEAL TI CUMBUST EXUIT TE FLUMT TE FLUMT ATE FLUMT ATE

		PSIA	U.LESS	DILESS	20.0	INCH	D.LE	DEG	DEG K	PSIA	INCHES	INCHES	U.LESS	DILESS	DE'S K	DEG K				MICRUNS	ш		24100	110		0.1655	100	~		FPS	0.4655		DEG R		DEG	DEG R	. HM/SEC	LBM/SEC
on	11	15.0000	0	0.0450	0.0574	2.1000	0.2700	0000006	560.0000	250.0000	4.0000	990000	0.0+00	2.0	0	710.0000	JP4	-		89.5248	0.0	ON SOLUTION	0-2141	0.9166	0.1943	0.4320	69500	3468.3394	DING	0.1942	2772.0	101	3189	0.2571	820.2552	1530.2532	0032	6250
	INPUT	= 1	פרן "	=	"	"	"	4C) =	"	FSN1 =	1131) =	SI. (XLC) =	sc) =	ALXI) =				001FUT	INJECTION	"	11	COMPUSITION		"	"	"	"		FLAME SPREADING	"		STREAMTUBE EFF.	11	- 1	"	11	"	11
SUL OF THIS TYPE		STATIC PRESSURE (PSD)	APPROACH MACH NO. (MOL	RAT	CTIVE FIA	F/H WIDINIFHWC)	CKAGE	FIH APEX ANGLE (ALPHAL	FUEL TEMP	For	TO P/H DISTA	21E 01	JLENCE LEVEL	FLUM AUDITI	SUURCE ILMP[1	FFECTIVE INLE	FUEL TYPE			MEAN URUPLET SIZE	FLASH VAPURILATION	HANE	-		ELTA 3	7		WAKE TEMP		INITIAL SPEED			RISE	-	AL LEMP KI	EXIT TEMP	FLUNKATE - AIR	FLUWKATE - FUEL

		PSIA	1.	0.1633	U.LESS	DILESS	INCHES	0.LESS	DEG	DEG K	PSIA	INCHES	INCHES	DOLESS	DILESS	DEG K	JEG R				MICRONS	D.LESS		DILES	DOLESS	0	in	1	DEG R		FPS	0.4655		DEG R		DEG R	DEG K	LBM/SEC	LBM/SEC
~ 1		15.0000	710.0000	0.2500	0.0500	0.0637	2.1000	0.2700	00000.06	560.0000		4.0000		0.0400	2	000	0	1P4	-		84.56.48	0.0		0.214	0.9160	0.1803	0.4320	76700	3574.8777		0.1936	0.2772	FICIENCY	336	0.2569	804.8762		1.0027	
11 11	INPUT	-	-			"	"	"	= ()	"	1 1X2	- () -	* ( ) =	= ()	EX1) =		"	"	TUNION	INJECTION	"	11	CUMPUSATION		"	"	"	"		ME SPREADING		"	STREAMTUBE EFF	"	- ×	11	11	"	"
STREAMTURE TYPE		IATIC PRESS	ACH TEMP	MACH	FIA RATIO	ECTIVE F/A	ATOIN H	CKAGE KATIOITAUL	APLX	FUEL	_	13 57	TO NO	ULENC	FLUX.	SUUR	TIVE INCET	FUEL TYPE			DAUFLET	FLASH VAPURILATION	WAKE C	-	BETA 2		N.L	WAKE F/A	AKE	FLAME	ITIAL SPEED	INITIAL TURBULANCE	STREA	11SE	COMPUSTION EFFICIENCY	ACTUAL TEMP RISE	EXIT TEMP	FLUWRATE - AIR	ı

		PSIA DEG K	0.LESS	DILESS	INCHES	DILESS	DEG A	4	INCHES	INCHES	DILESS	DILESS	DES K	DEG R			MICKONS	D.LESS		DILESS	DILESS	DILESS	DILESS	DILESS	DEG R		FPS	DILESS		DEG R		DEG K	DEG K	LBM/SEC	LBM/SEC
<b>9</b> M	- 17	15.0000	0.0500	0.0637	2.1000	0.3500				00000-99			00000	710.0000		5	89.5248	0.0	SOLUTION	0.2142				8740.	3901.9136	SPREADING	0.2084	0.3440	EFFICIENCY	3366.4673	0.3152	1061.1807	1771.1807	0.1735	655000
	INPUT	=(391)=					" " ()	F 5K1 =	= (757)	ST. (XLC) =	= ()	4CXI) =	(I) =		11	TUTPUT	"	u	COMPUSITION	"	11	"	4	11	"	FLAME SPRE	"	"	STREAMTUBE EN	"	" X	"	11	11	11
STREAMTOBE TYPE NO. UF THIS TYPE		STATIC PRESSURE(PS6) = APPRUACH TEMPERATURE(160)=	INFUT F/A KATIO(FAC)	EFFECTIVE F/A RATIO	F/H WIDTH(FHWC)	BLUCKAGE KATIO(TAUC)	S/R FUCL TEMP(TESK)	FUEL PRES	TO PAH DISTA	21E 01	JENCE LEVEL	DOLTI	SOURCE TEMP(T	EFFECTIVE INLET TEMP	FUEL TYPE		MEAN DRUPLET SIZE	FI ASH VAPURIZATION	MAKE		BETA 2			WAKE F/A			INITIAL SPEED	INITIAL TURBULANCE	STREA	TEMP RISE	NOTI	IL TEM		FLUWKATE - AIR	

		PSIA DEG R	D.LESS	DILESS	INCHES	DILESS	DEG	P. I.A	INCHES	INCHES	D.LESS	DILESS	DEG R	DEG R				MICRUNS	0.4655		91.0	DILESS	0.1655	DILESS	DILESS	DEG R		FPS	DILESS		DEG R		DEG R	DEG R	LbM/SEC	LBM/SEC
01	5	15.0000	0.0400	0.0510	2,1000	0.2700	0000-06	250.000	4.0000	0000099	00+0-0	0.0	460.0000	716.0000	JP4	<b>L</b> 5		80	0.0	TON SOLUTION	0.21	0.9166	0.2105	0.2320	0.0445	3347.0707	SPREADING	0.1856	0.2772	EFFICIENCY	2951.2939	0.2515				
	INPUT	E(10C)=		n	11	"	#C) #	3		(XFC) =	= ()5	#EX [] =	= (TX		"	OUTPUT	INJECTION	"	"	COMPOSITION		"	"	"			FLAME SPRE		"	STREAMTUBE E	"	- X	"	"	"	"
STREAMTUBE TYPE NO. OF THIS TYPE		STATIC PRESSURE(PSO) = APPROACH TEMPERATURE(10C) = APPROACH MACH NO (MCC) =			HIOLE	CKAGE	F/H APEX ANGLE (ALPHAC	FIFE	TU F/H D	TO N022	TURBULENCE LEVEL (EPSC)	4			FUEL TYPE			MEAN DRUPLET SIZE	FLASH VAPORIZATION	MAKE	1		8E14 3		WAKE F/A			INITIAL SPEED			IDEAL TEMP RISE	COMPUSTION EFFICIENCY	ACTUAL TEMP KISE	EXIT TEMP	FLUWRATE - AIR	LATE -

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COMBUSTION EXIT	TE EFFICIENCY TEMP	DILESS	0.5146 4184.8154	0.5293	0.5168	0.5168	0.01+7 20+2.	1753.	0.2569 1574.6762	0.3152 1771.1607		0.2515 1.52.350	FLOW = 0.0600 0°L	ENCY = 0.2694 D'LESS	Y = 0.3185	E = 698.8313 DEG	= 1809.1572	= 1569.7788 DEG	= 18.0052 LBM	100 0570 0
MASS	FLUMRATE	LBM/SEL	0.5205	0.5165	0.5161	0.5161	0.3963	1.0002	1.0047	6.77.5	0.7734	1.0050	ENGINE	EFF1C1 ENCY	EFFICIE	TEMPERATURE	EXIT TLMP	EMPERATURE		
FUEL-AIR		0.4455	00.0.0	0.0450	0.0500	0.0500	0.0450	0.0450	0.0500			00+0-0	FLOW/TOTAL	COMBUSTION	COMBUSTION EFFICIENC	NG AIR TEM	NE	-	u	0110 011
SIREAMIUBE	TYPE		1	2	n	1	•	۰	1	۵	,	10	COU! ING FI		INERMAL CL				OTA	C. 4. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1.

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STREAMTONE TYPE = 10  NO. OF THIS TYPE = 10  STATIC PRESSURE(PS6) = 15.00000  APPRUACH TEMPTON = 1660.0000  APPRUACH MACH NO.(M6H) = 0.2500  FOR WILLINGHMH) = 0.2500  BLOCKAGE RATIU(TAUH) = 0.2500  BLOCKAGE RATIU(TAUH) = 0.2500  FOR TO NUZZLE DIST.(XCH) = 0.2500  INTIAL FOR DIST.(XCH) = 0.2500  AND TO NUZZLE DIST.(XCH) = 0.2500  INTIAL TOWE LEVEL(EPSH) = 0.2500  AND TO NUZZLE DIST.(XCH) = 2.2500  AND TO NUZZLE DIST.(XCH) = 38900  AND TO NUZZLE DIST.(XCH) = 0.1240  AND TO NUZZLE DIST.(XCH) = 38900  AND TO NUZZLE DIST.(XCH) = 0.1240  AND TO NUZZLE DIST.(XCH) = 38900  AND TO NUZZLE DIST.(XCH) = 0.1240  AND TO NUZZLE DIST.(XCH) = 38900  AND TO NUZZLE DIST.(XCH) = 0.1240  AND TO NUZZLE DIST.(XCH) = 38900  AND TO NUZZLE DIST.(XCH) = 0.1240  AND TO NUZZLE DIST.(XCH) = 38900  AND TO NUZZLE DIST.(XCH) = 38900  AND TO NUZZLE DIST.(XCH) = 0.1240  AND TO NUZZLE DIST.(XCH) = 38900  AND TO NUZZLE DIST.(XCH)	-0		<				DEGREES				DILESS			DILESS		FPS	D.Less	DEG R	DILESS	DEG K		LBM/SEC	LBM/SEC
THIS TYPE THIS TYPE THIS TYPE THESSURE (PS6) THEMPITOH) THEMPITOH (ATTIUGE H) THEMPITOH	- 3	<b>T</b> 0	1>.0000	1660.0000	0.2500	0.0500	600000	0.2500	66.0000	8.0000	0.0400	1P4	5	0.1334	0.9988	2.0567	0.2618	2236.8818	1.0000	2236.8618	3896.8818	0.2482	0.0124
KEAMTUBE TYPE  TIL PRESSURE (P PRUACH TEMP (TOH PRUACH MACH NO. EL AIR AATJUSTA  H MID HISTHMH) H ALL MINGHAH) H AN WOUZLE DIS  CLASS ANGLE (ALI  CLASS ANGLE  CLASS	" "	d.	-		= (H9H)		PHAH) =	" (H)	I. (XLH)=	CE (LSH)=	EPSH) =		9100			E0 =	E LEVEL=		NCY	RISE	"		11
	STREAMTUBE TYPE		1		ACH	AIK	APEX	CKAG	F/H TO NOZZLE DIS	2	JENCE	FUEL TYPE						MP	MBUSTION EFFICIE	TUAL TEMPERATUR	•	1	1

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NO. UF THIS TYPE	**	31	•
	INPUT	5	
STATIC PRESSURE(PSO)		15.0000	PSIA
APPRUACH TEMP(TOH)		1660.0000	DEG R
APPROACH MACH NU. (MOH)	11	0.2500	DILESS
FUEL AIR KALIU(FAH)	"	0.0550	D.LESS
F/H MIUIN(FHMH)	"	0.7500	INCHES
F/H APEX ANGLE (ALPHAH)	"	0000000	DEGREES
BLOCKAGE RATIO(TAUM)	,,	0.2500	DILESS
F/H 10 NUZZLE DISI. (XLH)=	11	66.0000	INCHES
S/R TO P/H DISTANCE (LSH)=	11	8.0000	INCHES
TURBULENCE LEVEL (EPSH)	"	0.0400	DILESS
Fig. TVD.	11	JP4	

#### DUTPUT

0.1334 D'LESS	0.9980 D'LESS	FPS	0.2618 D'LESS	DEG R	3.4655		DEG K	LBM/SEC	LBM/SEC
0.1334	0.9980	2.6786	0.2613	2211.9614	1.0000	2211.9614	3871.9614	0.2479	0.0136
MAKE KECINCULATION COLF =	MAKE EFFICIENCY =	INITIAL FLAME SPEED =	INITIAL TURBULENCE LEVEL=	LUEAL TEMP KISE =	CUMBUSTION EFFICIENCY =	ACTUAL TEMPERATURE KISE =	CXIT TEMPERATURE =	FLUWKATE - AIR =	FLUWRATE - FUEL =

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<b>m</b> 2		P514	0.1.55	DILESS	INCHES	DEGREES	DILESS	INCHES	INCHES	DILESS			D.LESS	DOLESS	FPS	DILESS	DEG R	3.1455	DEG K	DEG R	LBM/SEC	LBM/SEC
m 01	10	15.0000		0.0500	0.7500	0000.09	0.2500	99.0000	8.0000	0.0400	*47	5			2.1442	0.2616	2210.8818	1.0000	2210.8818	3920.8616	0.2443	0.0122
	TUPUT			19	*		n	KLH)=	- SA)=	" 7		104100	DEF =			EVEL=	"	" _	15c =		"	
SIREANTUBE TYPE NO. UF THIS TYPE		STATIC PRESSURE (PSG)	APPRUACH MACH NO. (Mah)	FUEL AIR NATIUIFAH)	MIDIALFHWAD	APEX ANGLEIALPHAN	CRASE NATIOITAUM)	TO NUZZLE DIST. ()	TO FIN DISTANCE IL	BILLENCE LEVELIEPSP	FUEL TYPE		WAKE KECIRCULATION COEP	E EFFICIENCY	INITIAL FLAME SPEED =	TIAL TURBULENCE LE	AL TUNF RISE	BUSTION EFFICIENCY	UAL TEMPERATURE RI	I TEMPERATURE	FLUWRATE - AIR	1

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		PSIA	DEG K	DILESS	DILESS	INCHES	DEGREES	DOLESS	INCHES	INCHES	DOLESS			DILESS			1.0		1.0		DEG R		LBM/SEC
.01	5	15.0000	1710.0000	0.2500	0.0550	0.7500	00000.09	0.2500	-	8.0000	0.0400	JP4	10	0.1368	0.9987	2.1670	0.2616	2185.9014	1.0000	2185.9614	3895.9614	0.2440	0.0134
	INPUT			16H) =			1 (HY)	= 7	015T.(XLH)=	E (LSH)=	= (HS		TUATOO	COEF =			LEVEL=	"	MCY =	415E =	"		
NO. OF THIS TYPE		TATIC PRESSURE (PSO	5		KATI	HIDTH(FHMH)	FIN APEX ANGLETALPHAN	TY	LE	10 F/H 01				AKE RECINCULATION CUEF	KE EFFICIENCY	INITIAL FLAME SPEED =	INITIAL TURBULENCE	EAL TEMP RISE	COMBUSTION EFFICIENCY	TUAL TEMPERATURE	EXIT TEMPERATURE	FLOWRATE - AIR	1

## COKE STREAM SUMMARY

EX11		DEG R	3896.8818	3871.9014	3920.8818	3895.9014
CUMBUSTION	EFF1C1 ENCY	DILESS	1.0000	1.0000	1.0000	1.0000
IASS	LUMRAT	BM/SEC	2647.	.2474	.2443	04420
FUEL-AIR	RATIO	J. LESS L	0.0500	0.0550	0.0500	0.0550
STREAMTUBE	TYPE		-	7	•	•

= 0.0200 D*LESS	= 1360.0000 DEG K	= 3696.3306 DEG R	= 0.9960 D*LESS	= 9.8440 LBM/SEC	= 0.0525 D'LESS		# 8.0000 INCHES	
M/E FUEL-AIR KATIO(FAV)	M/b INLET TEMP(TSH)	AVG EXIT TEMP	AVG CUMB. EFFICIENCY	TOTAL FLOWRATE	AVG FUEL-AIR KATIU	AVG DISTANCE FROM	SPRAYBAR 10 F/H	AUC INTAL TEMB LISE